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VOL. I.—42ND YEAR

SYDNEY, SATURDAY, JUNE 11, 1955

No. 24



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(W.H.O. Tech. Rep. Series, No. 57, 1952.)

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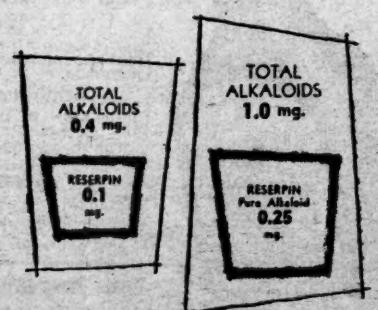
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The Sir Richard Stawell Oration.¹

THE PROFESSIONS IN OUR NATIONAL LIFE.

By C. G. McDONALD,

President, The Royal Australasian College of Physicians, Sydney.

My earliest memory of Richard Rawdon Stawell goes back to November, 1919, when I was holidaying at Marysville on the Black Spur mountain. I have a vivid memory of a tall, angular, ascetic figure in his middle fifties, clad in "plus fours" and accompanied by his daughter, making for the fields with butterfly net in hand. His slow, deliberate, cultured speech, his slight scholar's stoop and a certain aloofness in his bearing, relieved when he spoke with restrained enthusiasm to his daughter of the entomological quest on which they were starting, told me at once that he was some person of distinction. "It is Dr. Stawell", whispered a woman behind me with that inflection of voice which at once betrays admiration. His great reputation as a physician and a clinical teacher was already known to me although I was a very junior medical graduate from another State.

¹ Delivered at a meeting of the Victorian Branch of the British Medical Association on October 6, 1954, at Melbourne.

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My next vision of Stawell was at the Australasian Medical Congress (British Medical Association) held in Melbourne in November, 1923, when he, along with Frank Andrew and others, discoursed to us on the subject of vertigo. When another famous teacher who came from Sydney suggested that vertigo was to be explained by anoxæmia or by toxic influences acting on the receptors of the vestibular nerve, Stawell protested indignantly against what he regarded as a simplification of a problem of multiple causes. As is often the case in conflicts between men of strong personality, each was right in his fashion and each was wrong. The Sydney physician had shown originality of thought in emphasizing a cause of vertigo now generally accepted, but he had been wrong in his assumption that it would explain most if not all cases of this condition.

When we reflect on the achievement of men like Stawell, we are tempted to ask what qualities bring a man to the forefront of his profession. Learning he must have, and skill in the performance of his craft, and the drive that goads ambition to its goal. But there are other qualities of the mind and heart which lift him to eminence. The old Roman quality of *gravitas*, a mixture of sincerity and probity, integrity in thought and action, call it what you will—this added to a warm humanity and wise forbearance exalts a man in the estimation of his fellows. This leadership is not to be gauged by prominence in the public view or financial success, but rather by the quiet and general acclaim of his professional colleagues. If I wish to know

who is a wise judge or a good advocate or a leading equity lawyer, it is to men of law that I should go, for only they can tell me.

When representative physicians of Australia met in Melbourne on June 21, 1920, for the purpose of forming an "Association of Physicians of Australasia including New Zealand", it was to Stawell that they turned as to their natural leader. He became the first president of the new body, holding office till his death in 1935. Had he survived a few years longer there is no doubt that he would have been chosen as the first president of The Royal Australasian College of Physicians, into which the Association of Physicians became merged in 1938. The Stawell Hall of the College, quiet as a garden with its comfortable chairs set in the sector of a circle and in rows narrowing gently from Stawell's bust beneath the gallery to the presidential dais, is a permanent monument to a physician who died before the College could claim him.

Because this notable figure in Australian medicine exercised an influence which flowed through his colleagues and students to the general community, the idea came to me to examine the roles played by the professions in our national life, the relationship of the professions to one another and to the people as a whole and their function in the ever-changing pattern of the nation's growth.

Observe in the first instance that the professions work in isolated compartments, each knowing little of the activities of the rest. It is different at the universities, where teachers and students of all faculties have contact with one another outside the class-rooms by means of college life, numerous societies and the university unions which for most are the counterpart of the college common-rooms. This commerce of men and women of widely differing intellectual interests helps in the promotion of that integration of learning which is the aim of true education. It brings home to them the essential unity of knowledge and it helps to counteract the utilitarian conception of the function of a university which is rife in many minds. It will be a bitter day for the professions and for this country if schools of medicine and engineering are transferred to hospitals and institutes and lose communion with those faculties which are devoted to fundamental and general studies. The separation of professional faculties from faculties of arts and science has been suggested to lessen the increasing burden of accommodation which will be thrown on Australian universities in the next ten years. The proposal comes sometimes from university men themselves. I have heard a professor preach the doctrine of divorce of all technical studies from university life. To him a university meant only a faculty of arts, although he grudgingly allowed a faculty of science. He did not wish the academic calm of the cloisters to be ruffed by the voices of men interested in human bodies or coal mines or legal disputes. He did not see that in this modern age when pure and applied science is so much in the ascendant, it is fatal for the humanities as well as for the professions if they are segregated in separate universities or institutions. The problem of overcrowding would be better met by the foundation of more universities or university colleges.

It is the regret of many professional men that they have not been educated in the arts, that they have but a smattering of Latin and other languages or know none at all, and that the great trinity of humanistic learning—poetry, philosophy and history—comes barely into the compass of their knowledge. And yet no student, be his main studies ever so technical, can fail to be broadened in mind and bear some stamp of scholarship if he lives a full university life. From his narrow task in the workshop of science he can gaze out on the physical beauty of the world, muse on the glories of thought and language fashioned by great men down through the ages, and contemplate if he will the moral goodness for which man strives. But he can do these things only if in hours of leisure he talks to good purpose with his friends and in solitude reads well and widely. Like the great African of the fourth century, every young student needs his Nebridius or Alypius with whom to converse, and cannot afford to disobey the "Tolle, lege" which keeps ringing in his ears. For scholarship

comes slowly and painfully by the stimulus of other minds through the medium of the spoken and written word. Christopher Dawson writes with approval of a hard-headed practical man like Francis Place burning his lamp into the small hours of the night after a hard day's work, from a sheer passion for knowledge. It is this zeal which so often makes the earnest amateur a deeper scholar than the professional teacher.

When the new graduate abandons the cloisters for the world, the technical activities of his profession absorb the greater part of his interest. He knows that graduation is but the beginning of his training. Henceforth with few exceptions he will work in collaboration with men of his own profession. The more active a professional man he becomes, the less he will know of other callings; the more he will be tempted, like Faust, to sell his soul to his work. It is this devotion to his task that often engenders in him a certain narrowness of mind and in observers a hostility or suspicion. Occasionally the young lawyer in the courts thinks he is in a world apart, free to play unrestrainedly with the emotions and weaknesses of his fellow men. The young doctor may yield to self-conceit, and when his nervous patient plies him with anxious questions may reply with short staccato answers. Fortunately the great majority of professional men manifest modesty and understanding in their relations with the men and women whom they serve.

While it is important that lawyers, doctors, dentists, architects and engineers should mingle freely with men outside their own professions so as to widen their interests, there can be no denial of the value of intraprofessional associations. Perhaps the strength of the medical profession in Australia lies in the numerous bodies which now represent it. We have our British Medical Association with its Federal Council, its six main branches and its innumerable local centres. We have three Royal Colleges and a plethora of specialist organizations. Yet all these divisions work in harmony, and should we believe that the integrity of our profession is being threatened, we speak with one voice. To a lesser degree the engineers are also lively in their intraprofessional relations. The activities of their societies do not come so much into public prominence, but there are no more impressive meetings than the national and international conventions of engineering graduates. At these conferences are collected men from Mount Isa to Yallourn, from Newcastle and Port Kembla through Broken Hill and Whyalla to the industrial centres of the west; and their discussions are the story of Australia's mining and secondary industries growing apace. When I mention the law I speak perhaps as one not wise, but if there is anything wanting in that great profession it is that its members have so few opportunities of meeting in legal assembly. Law conventions are all too rare, and the profession casts too much responsibility on bar councils and law institutes for the preservation of its interests and rights. There is no organization in Australia like the various Inns of Court which do so much in England for the education, social advancement, entertainment and moral strength of the profession.

I mention these matters because no group of men, however learned, can achieve the full value of their labour unless they can come frequently together for that inspiration which will still linger with them when they become immersed in their work. For every profession has its ideal, and when large numbers of men with a common interest meet for their mutual advancement there are always some among them who will point the way to what is best and noblest in the pursuit of their tasks. Every profession has its prophets, but too many are prophets of a former age. The prophets are its great men who, knowing and understanding the great traditions of the past, can see with confident eye into the future. We in Australia have had to look too much to the great men of the United Kingdom who have given to our professions their glory and their stamp. Our vast distances have prevented that close association of minds which is the stimulus to greatness. But one day, I hope not so long distant, Australia will have its Blackstone with his love of the tradition of the law, or its Bentham with his passion for reform, or its

Osler with his priest-like call to physicians to dedicate their work to "the beauty of holiness" and the service of mankind. For each learned profession can remain great only while it produces great men.

Success comes to the professional man who has a love for his calling, native skill in his craft, the confidence which comes from knowledge and experience, and the ambition that spurs him on. And yet all these qualities, good as they are, are not enough to raise a profession above a trade. Some of us fulfil all these postulates and yet are in no sense exemplars of what is best in learned professions. In these days when men and women are perplexed and uncertain, when our social system is unstable and our national heritage imperilled, it is not enough to be a successful lawyer or doctor and yet have little or no impact on the country as a whole. All of us know from history, ancient and modern, on what tenuous foundations society rests, and in a country like Australia where there is no ruling class and opportunity waits to be seized by every talent, who can best make our civilization secure but those who are the products of our universities? We, who are of the people, should, in return for the educational privileges granted to us, show that we are not unmindful of our responsibility to the nation.

The truth is that we are not philosophers. Philosophy, the mother of all the sciences, beckons to us and we pass her by. We do not realize that the philosophers of today inspire the rulers of tomorrow, and according to their teaching they can give happiness or misery to the world. No one, for example, can doubt the wholesome influence of Aristotle not only on Greco-Roman thought and action but on the whole course of the history of Christian Europe. But there are other less happy instances. We are apt to smile at Nietzsche's insane conception of the "superman" with his contempt for mercy and compassion and his hatred of the weak and the diseased. Yet Nietzsche's philosophy found stark expression within a few decades of his death in the story of Dachau and Beisen. Let me give one other example. In 1867 an unknown German exile after years of study by day and night in the British Museum published a book which was both philosophical and political. Fifty years later a dynasty toppled in Russia. But revolutions never end with the overthrow of a tyranny. The idea must go on to its tragic conclusion. And so a new social system arose, doctrinaire, pragmatic and material, and began to permeate the world. How many of us realize that when the multitude is apathetic a few men of strong ideas can change our destiny overnight?

Some of you here will have nostalgic memories of a period before the first World War when the British Empire was strong and intact and the spirit of philosophical liberalism, so apparently humane, so reasonable and benign, still determined the actions of most men. Our Western culture was still integral, and the voices of the kindly prophets of the nineteenth century were echoing in our ears:

Grow old along with me,
The best is yet to be!

We had paid no heed to Shelley, our own herald of revolt, or to Matthew Arnold, who had attacked our Philistinism. We had tried to forget Wesley, and we had ignored the leaders of the Oxford Movement who had foreseen whether the spirit of liberalism would lead. The first World War rolled by and optimism still prevailed; but in 1939 an American Quaker scholar¹ saw clearly where our civilization was drifting. Just before his death he wrote as follows:

One returns from Europe with the sound of weeping in one's ears . . . An awful solemnity is upon the earth, for the last vestige of earthly security is gone. It has always been gone, and religion has always said so, but we haven't believed it . . . One comes back from Europe aghast at having seen how lives as graciously cultured as ours, but rooted only in time and property and reputation . . . are now doomed to hopeless despair.

We in Australia find it difficult to appreciate the terrible significance of these words, but their truth is written in

the hearts of countless Europeans. No educated body of men can afford to ignore spiritual and philosophical issues as they affect society. Perhaps Edith Cavell had this idea in mind when she uttered her famous words, "patriotism is not enough".

The influence of the professions on our personal life and on our national development is much more complex now than it was in the days of our fathers. We could define a professional man, then, as one who had the necessary learning and scientific knowledge to provide at a high level for the basic needs of the individual person—religion, justice and health among them. The so-called learned professions were divinity, law and medicine, but this was a classification derived from universities where these subjects formerly constituted the main professional studies. Many other branches of knowledge and skill have since come into the definition, and indeed with the recent employment of graduates in arts, science and economics in the vast management and development of the nation, it becomes increasingly difficult to delimit the functions of a profession.

The new policy of the Commonwealth Public Service Board illustrates the widening trend of professional interests. Before the war relatively few classes of professional men and notably lawyers, doctors and engineers were employed in Commonwealth departments in both technical and administrative positions. Since the war the ever-expanding field of government activities has led to the employment on a large scale of university graduates as economists, education officers, psychologists, training officers and research officers. Further, graduates in all faculties including arts, science and economics are recruited into the general ranks of the service in the expectation that their academic training may contribute to the efficiency of our civil administration. A similar tendency is manifest in the increasing employment of graduates in commerce and in industry.

If we narrow our notion of a profession to an occupation in which learning and skill at a high level are applied in the practice of a specific art or science to the affairs of others, there can be no doubt that professional men in this country perform their tasks conscientiously and well. Doctors in general practice and in the specialist fields are forever improving their technical knowledge by courses of post-graduate study and by delving into medical literature. Law books and case reports in conservative brown leather bindings seem to be the armamentarium of barristers and solicitors, while practice in court or chambers or in office keeps a sharp edge on the lawyer's mind. Competition urges us on. But how few of us do our work with that sense of vocation, that infectious enthusiasm and that mental glow which affect and inspire the precious human material on which we work? Some of you will remember gratefully teachers at school who perhaps opened up for you the glorious vista of English literature, or taught you the nuances of language in your own or in a foreign tongue, or directed your gaze to the enchanting world of science. But others of your teachers will have been forgotten or be half hidden in that limbo of your mind where memories of dullness and ennui dwell. The advocate whose function is to expose the springs of human action and bare the motives of men is most brilliant and most successful when his intellectual powers are warmed by ardour for his work. But who can have this quickening spirit without love of his art and pride in the profession to which he belongs? And pride in a profession means pride in its achievement.

The status of every calling in the community is determined by the quality of the men who belong to it and by the esteem in which its leaders are held. The skill and experience, wisdom and sagacity, which go to the making of the great lawyer or doctor or architect, are handed on from generation to generation through his colleagues and pupils till they become part of the inheritance of his profession. It is true that in the procession of life which makes up the pageant of every nation, here and there a creator in literature or the arts, or a great scientist, or a statesman with synoptic vision, towers above the rest; but though less exalted, the professional man holds his pride

¹ Thomas R. Kelly, quoted by Jacques Maritain in "Education at the Crossroads".

of place, for he is close to the hearts of the men and women among whom he works. He is, according to his bent or training, the guardian of their liberty or the protector of their health or the guarantor of their comfort in home and street or the instructor of their children.

No review of the work of the professions in Australia would be complete without reference to the part now played by them in this land of the sliprail and the spur. The development of this country since the morning when Lieutenant Hicks on the *Endeavour* first glimpsed the ninety-mile beach of eastern Gippsland to the present day has been extraordinary. We all know, and many of us have seen, the panorama of our agrarian life extending from coastal farm to remote cattle station. The story of wool is in large part the history of Australia, but there are other things besides. A friend of mine who is a scholar and an observer, travelling recently over vast stretches of New South Wales, told me that as he passed from the dairy land of our coastal strip through our sheep country and still further inland to the broad fields of our wheat, he noticed an ever-mounting affection for the soil reflected in the bearing of our country people. They had a profound pride in the land. Can we wonder that Cicero, when he could forget his admiration for the liberal profession of the law—his own calling—gave praise to tillage of the soil as the occupation most worthy of a free man?

This growth of our primary industries we owe in the first instance to our pioneers and their successors; but in recent years the influence of science on the volume and on the quality of our products has been astonishing. The work of our veterinarians, agricultural scientists and other scientific and professional men under the control of the Commonwealth Scientific and Industrial Research Organization has been brilliantly used for the improvement of our land and animal husbandry. The days when farmers, graziers and dairymen relied on their own knowledge are gone. Today they are grateful to this splendid organization, which has shown them how science can increase fertility and augment production to the great advantage of Australia.

The story of our secondary industries with their increasing diversity, of our mighty production of steel, of our enormous power projects and irrigation schemes and of our mining and engineering operations is in large measure a record of the work of engineers, so many of whom are graduates of the universities. Having closer intercourse with the community and more concerned as they are with human relations, lawyers and doctors are prone to forget the importance of engineers in the national economy; but on quiet reflection none of us can fail to see how dependent the nation is on this important profession for its industrial expansion in peace and its defensive powers in war.

There are other achievements, frankly Australian, of which we think very little, but which fire the imagination of visitors to Australia. Let me mention two which have a medical connexion. One is the Flying Doctor Service, whose members in response to radio appeals make long flights over the inland, ignoring the barriers of States and territory. The other is the Far West Children's Health Scheme with its clinic on wheels hitched to a train puffing its way through isolated centres of the outback. In this latter organization physicians, surgeons, orthopaedic surgeons and dentists combine with nurses and physiotherapists to give babies and children in isolated centres the same meticulous care which is accorded in city hospitals. The Flying Doctor Service and the Far West Children's Health Scheme are memorable for another important reason—they provide a means whereby big-hearted men and women of the community can combine with professional men in noble works of mercy and charity.

This is truly a scientific age. The common man meets the products of science wherever he turns. Enjoying the comforts which science brings, he is disturbed when the thought comes into his mind that it may be used for his destruction. It would be better and more true if he reflected that it can and will, if necessary, be used for his protection. The application of science to Australian life is already a brilliant page in our history; but we have not

used it entirely for our own advancement. We are sharing our knowledge with students from the Far East and from South-East Asia who come to us under the Colombo Plan, and by means of Radio Australia with its short-wave transmission we entertain and instruct countless children and adults in the East Asian countries to our north. How seldom do we hear reference to this splendid work of the Australian Broadcasting Commission, and how few of us appreciate the friendliness and goodwill that flow out over the ether from this country to India, Pakistan, Burma, Malaya and Indonesia! There is little integration of our publicity, and the small voice of our propaganda hardly reaches our own people.

We need an awakening of Australian national sentiment. Too many of us witness the drama of our national life with what seems dogged indifference. We are reluctant to give expression to pride in our achievement even when we feel it. How many of us, outside architects, appreciate the greatness of Greenway or of Blacket or know the triumphs of Australian architectural design in the decade before the outbreak of the last war and in the last few years as this land has moved to economic recovery? Who of us know the part played by our great lawyers in the foundation of our Commonwealth and in the writing and interpretation of our constitution? Farrer and Lawrence Hargrave, though English by birth, made their discoveries here; but how many Australians have ever heard of them? Who knows the part played by Australian doctors in the conquest of malaria, which did far more to defeat the Japanese in the last war than the dropping of an atom bomb on Hiroshima? And so the rhetorical questions could go on. It is often said that we have never produced a great poet or a great writer of prose; but literature is rooted in the soil, and only national pride can bring it to full efflorescence.

We need expression of our Australian national sentiment. A few of our newspapers publish from time to time records of our progress in primary production and secondary industries and in education, literature and art. But there is no concerted attempt by Press or radio to kindle in Australian minds the dormant flame of their national pride. In a vast country like Australia, where there is a wide dispersal of the rural population and even the over-crowded cities are far apart, some strong force is needed to make us a more unified nation. As it is, we are beset by interstate jealousies and torn by political and industrial rivalries. The "rugged individualism" of the Australian may be a valuable asset in the outback or even in the field of war; but carried to extremes in populated areas it breeds dissension and strife. We lack the Englishman's deep respect for his history and institutions, and we have not yet developed his full pride of race. These qualities, latent within us, need the ferment of publicity to animate them. Here is a splendid opportunity for our newspapers and for our Australian Broadcasting Commission. They need no muse of fire to tell the story of our country's achievement. It is worth the telling, and when it is told the professions will be found to have played no unimportant part.

CLINICAL ASPECTS OF ELECTROENCEPHALOGRAPHY.¹

By JOHN GORDON,
Adelaide.

IT was in 1929 that Hans Berger first recorded the electrical activity of the human brain. However, as far back as the latter part of the nineteenth century a few workers had discovered evidence of electrical activity in the brains of living animals, and considered that this activity was related to cortical function.

After his initial report Berger published a series of accounts of normal and abnormal findings, and by 1934

¹ Read at a meeting of the South Australian Branch of the British Medical Association on October 28, 1954.

had described many of the changes with which we are familiar today. His work was originally confirmed by Adrian and Matthews, who agreed with Berger in his views that the potential alterations recorded were due to the electrical activity of the cortex. This resulted in a great deal of work on the subject in the few years before World War II. By now a vast amount of literature exists,

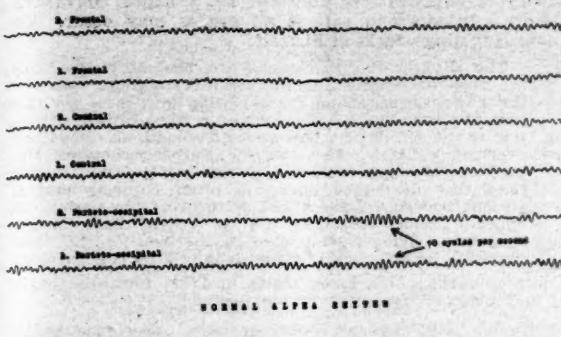


FIGURE I.
Showing α rhythm.

and electroencephalography is a well established procedure in neurological and psychiatric centres, and is regarded as a valuable ancillary aid in neurological and neurosurgical investigation.

To a large degree, the clinical basis of electroencephalography has been due to the work of three main groups of workers: Walter, Williams, Hill, Cobb and Dawson in Great Britain; Lennox, Gibbs and Gibbs in the United States of America; and Jasper, Penfield, Kershman and Elvidge in Canada.

Technique.

As Denis Williams has stated, it is a reasonably simple matter, with adequate apparatus, to get an electroencephalographic record from a patient, but it calls for training and

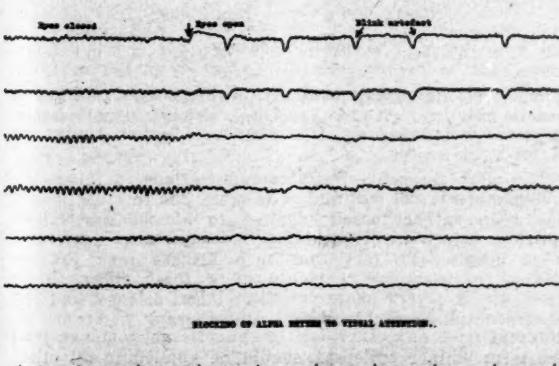


FIGURE II.
Showing α rhythm.

experience to get a good one. Also, it is easy enough to obtain a factual account of the electrical potential changes seen in a record; but a correct and reasonable interpretation of those changes calls for much experience on the part of the observer, who should be well trained in clinical neurology and neuropathology.

The cortical potentials are recorded from the scalp by a series of silver electrodes enclosed within a saline pad.

These electrodes are placed symmetrically on the scalp (which need not be shaved) in pairs, about 20 being used altogether, and held in place by means of a rubber cap.

The potential difference between pairs of electrodes is fed into a series of amplifiers, and these finally work several ink-writing oscillographs (usually either six or eight) and a continuous tracing is thus made on the recording paper. A special switch allows various electrode pairs to be used at various times, so that the full scalp area can be explored in an orderly fashion.

The total period of actual recording, apart from the application of the electrodes, lasts about half an hour, and an average record takes up some 150 feet of paper, perforated to enable it to be folded concertina-fashion into a book.

Interpretation of a record is made by visual analysis and careful assessment of the various rhythms which may be present.

It should be emphasized that, valuable as electroencephalography may be, it must always be correlated with the clinical picture, and never be regarded as a substitute for a clinical neurological examination.

Moreover, some knowledge of the clinical problem is necessary beforehand, as this will modify to some extent

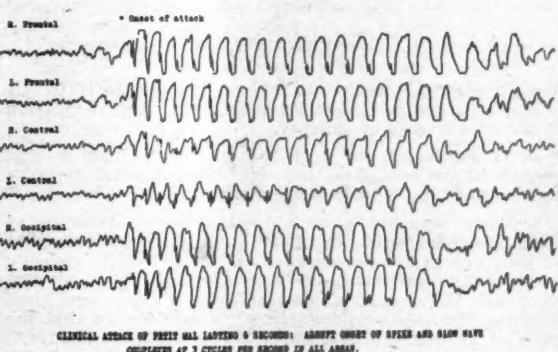


FIGURE III.

the technical procedure adopted; if, for example, a subdural hematoma or cerebral neoplasm is suspected, more time must be spent in search of evidence of localization or lateralization.

The following will be the headings under which I will briefly discuss the present subject: (i) the normal electroencephalogram; (ii) the epilepsies; (iii) intracranial expanding lesions; (iv) head injuries; (v) cerebrovascular lesions; (vi) diffuse, inflammatory, toxic or degenerative cerebral disease.

The Normal Electroencephalogram.

The normal adult electroencephalogram is characterized by the presence of a cortical rhythm having a frequency range from eight to 13 cycles per second, with an amplitude of 10 to 100 millivolts. This is the α rhythm, and it arises from the parieto-occipital cortex on either side and spreads forward equally over both cerebral hemispheres. It occurs when the eyes are closed and is due to the synchronization of electrical potential from a large number of occipital neurons in the visual cortex.

Characteristically, the α rhythm disappears with visual attention, as when the eyes are opened (Figures I and II).

In young children the frequency of the waves normally seen may be slower; the rhythms may be the so-called θ rhythms, which range from four to seven cycles per second or even less—for example, waves at one to three cycles per second, which are called δ waves. In general, the slowest rhythms predominate in early life and then

gradually increase until the α rhythm appears as the dominant or entire one of adult life.

The Epilepsies.

There can be little doubt that electroencephalography has its foremost application in epilepsy, and has become generally accepted as an almost indispensable aid in the

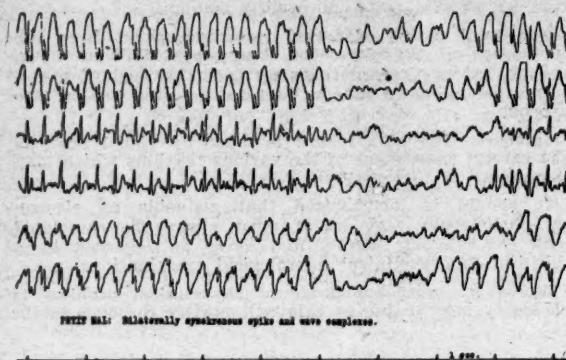


FIGURE IV.

modern diagnosis and treatment of epileptic patients. It is now regarded as a routine procedure in the investigation of almost any case of epilepsy.

It is impossible to deal properly with such a vast subject in the available time, but a few general remarks can be made and illustrations given.

Epilepsy presents a social and economic problem of some size. Statistics in various countries indicate that at least one in 200 people have epilepsy. This is probably a conservative estimate, as there are probably many subjects who suffer minor seizures which are not recognized as being epileptic manifestations. It would seem that the basis of an epileptic seizure is the spontaneous abnormal discharge of a group of neurons in the brain. Historically, the term "epilepsy" was at first used only in reference to patients who fell or showed convulsive movement—the

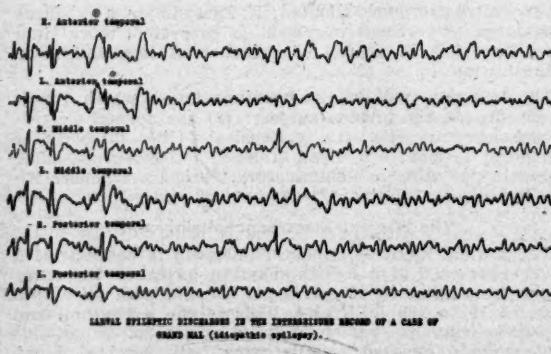


FIGURE V.

so-called *grand mal*. Gradually the existence of what was called "partial epilepsy" came to be recognized, and by the first half of the nineteenth century attention was being focused on the various initial symptoms of epileptic seizures or the aura. However, it was Hughlings Jackson who realized the significance of epilepsy and the aura, and translated it into the conception of a local discharge in cerebral grey matter spreading to neighbouring areas.

If the abnormal discharge occurs in a localized area of the cortex, then the clinical manifestation will be a distorted version of the normal function of that part of the brain—for example, a flash of light if it arises in the occipital or visual cortex, jerking of the limbs if it arises in the motor area, and so on. If the abnormal discharge does not spread, this is all that may happen; but on the other hand, it may be more intense and become generalized, when the aura will be followed by a major convulsive seizure. In any one patient all grades may occur. To quote Hughlings Jackson himself:

The slighter the paroxysms are, the more deserving are they of minute and precise investigation, both for the patient's sake and for scientific purposes; for the patient's sake since, unless we give more careful attention to the details of them, we shall sometimes altogether overlook epilepsy; for scientific purposes because the analysis of slight seizures is more easy and fruitful than that of severe ones. It often happens that a patient has sometimes slight seizures of the variety of epilepsy under remark, and at other times severe seizures. Obviously, the clue to the seat of the "discharging lesion" is only given definitely by the warning.

These remarks of Jackson, made in 1888, form the basis of our present conception of epilepsy.

Clinical and electroencephalographic experience today indicates that epilepsy can be classified into two big

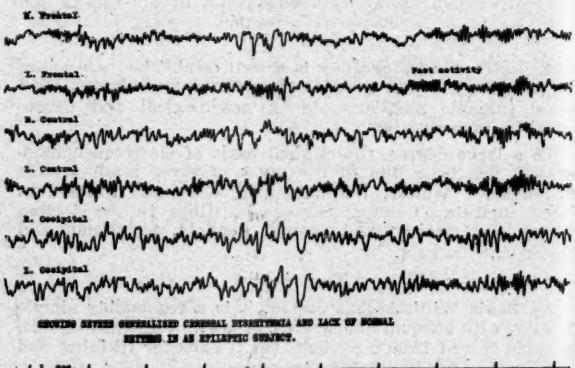


FIGURE VI.
Idiopathic epilepsy.

groups: (i) idiopathic epilepsy, which seems to have a genetic aetiology; (ii) focal epilepsy, which is usually based on some underlying acquired structural lesion, benign or otherwise.

The more frequent clinical manifestations of idiopathic epilepsy are *grand mal* and *petit mal*. The term *petit mal* has been rather loosely applied to almost any minor epileptic attack involving brief interruption of consciousness, despite the fact that such attacks may provide clinical or electrical evidence of a focal onset. True *petit mal* is a very characteristic clinical seizure, and the electroencephalographic record and therapy of it are so different from any other sort of epileptic phenomenon that the term "minor epilepsy" should be applied to all other types of sudden brief disturbance of consciousness. Moreover, true *petit mal* never occurs as a result of acquired lesions and may be taken as certain evidence of idiopathic epilepsy (Figures III, IV and V).

Recent work would seem to indicate that the site of the discharges in these cases arises in the deep central diencephalic structures, such as the thalamus, and thus both cerebral hemispheres are fired off synchronously.

Petit mal, especially if unaccompanied by *grand mal*, is often unsuspected, and children are often falsely accused of day-dreaming or of being inattentive in school *et cetera*. In almost 100% of such cases the electroencephalogram will provide the correct diagnosis.

In other cases of idiopathic epilepsy, the electroencephalogram may reveal a generalized disturbance of the normal cortical rhythms in a diffuse fashion, and may lack any definite evidence of paroxysmal epileptic outbursts (Figure VI).

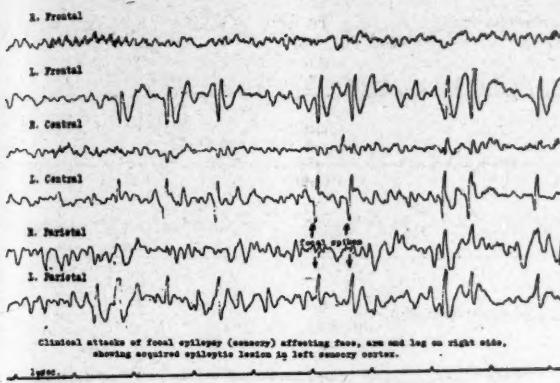


FIGURE VII.

Sensory epilepsy in a child, aged nine years, following encephalitis at an early age.

Focal Cortical Epilepsy.

Focal cortical epilepsy is a most fascinating type. Here the abnormal cortical discharge occurs in a localized area of the cortex, and is nearly always symptomatic of an underlying structural cortical abnormality, which may be anything from a simple scar to a cerebral tumour.

As was stated earlier, the more attention one gives to the initial phenomena or aura of epileptics, the more one is hesitant to call the condition idiopathic. The classical example of a focal cortical seizure is, of course, the Jacksonian attack. Here the patient with a lesion in the lower part of the motor cortex may have an attack commencing with twitching on the contralateral side of the face, with jerking spreading to involve the shoulder, arm, fingers, leg and toes in that order—or the attack may be so brief that only the face twitches, or so sudden and intense that generalized convulsions rapidly ensue. In such a case it is clear that the vital clue in assessing the significance of the attack is the history, not of *grand mal* seizures, but of the minor seizures with their focal onset.

However, the initial phenomenon may not be a motor manifestation, but a subjective sensory or psychic one. According to the severity of the particular attack, so the aura only may occur; or it may be followed by a major

seizure. In the former instance the episode must still be regarded as a minor epileptic manifestation, even though convulsions do not occur and the subject retains a fairly normal conscious level.

According to the anatomical site of the epileptic focus, so the patient may experience an aura or attack of a certain pattern. Visual sensations of a crude unformed type may constitute the initial phenomenon and be described as flashes of light or colour when the focus arises in the visual or occipital cortex. A sudden paroxysm of paraesthesiae of a peculiar type, such as tingling, "pins and needles" *et cetera* down one side, may be the initial symptoms in a seizure from an excitable focus in the opposite sensory cortex. The onset of an attack may be heralded by bizarre psychic phenomena, such as olfactory, visual or auditory hallucinations of a highly organized nature, and in these cases the epileptic focus is usually located in the temporal lobe.

The types of sensation described by patients are very varied, although any one subject tends to experience repetitions of the same type of sensation. In one type of epilepsy the whole attack may consist only of a period of automatic or semi-purposive behaviour which may last for several minutes. During this period the patient is paralysed intellectually at a high level, but may talk incoherently.

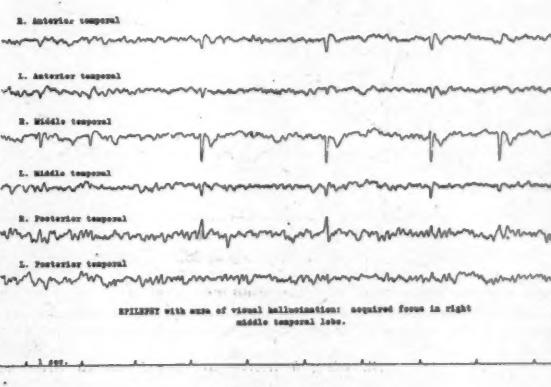


FIGURE VIII.

Temporal lobe epilepsy in a child, aged eleven years, following measles encephalitis six months previously.

make bizarre movements or appear in a dream-like state. This is so-called psychomotor epilepsy, and there is now firm evidence that this condition is based upon a focal epileptic process in the anterior temporal lobe.

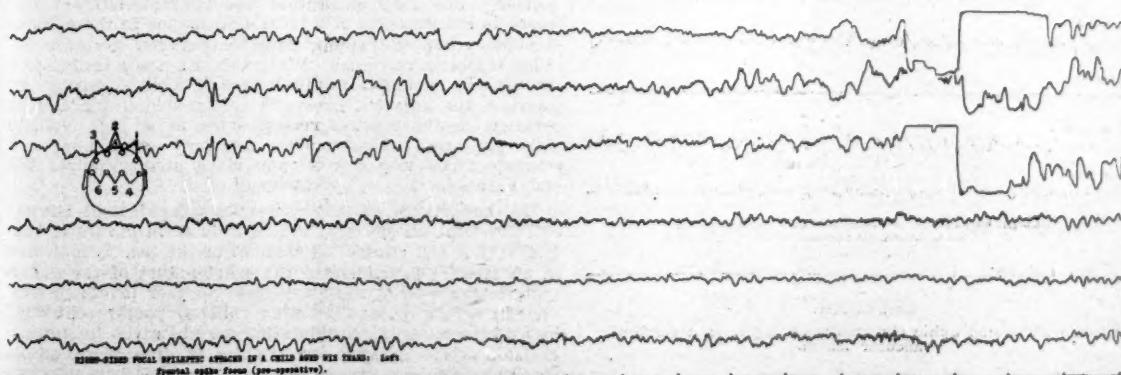


FIGURE IX.

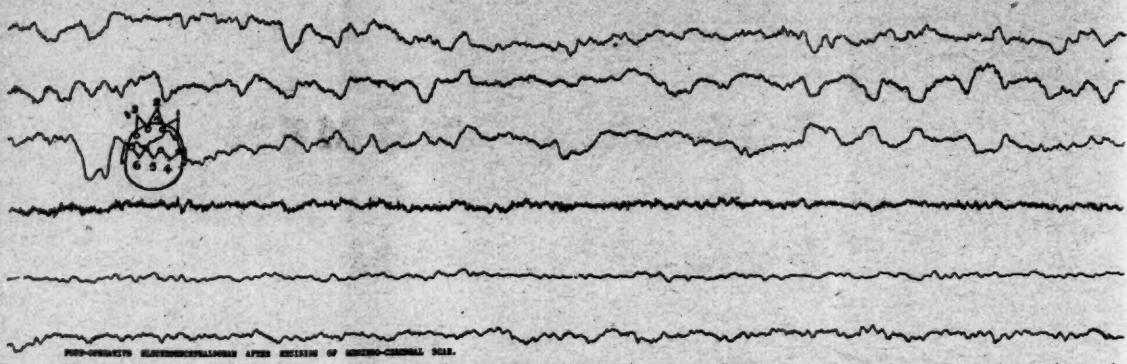


FIGURE X.
Disappearance of spike focus after excision.

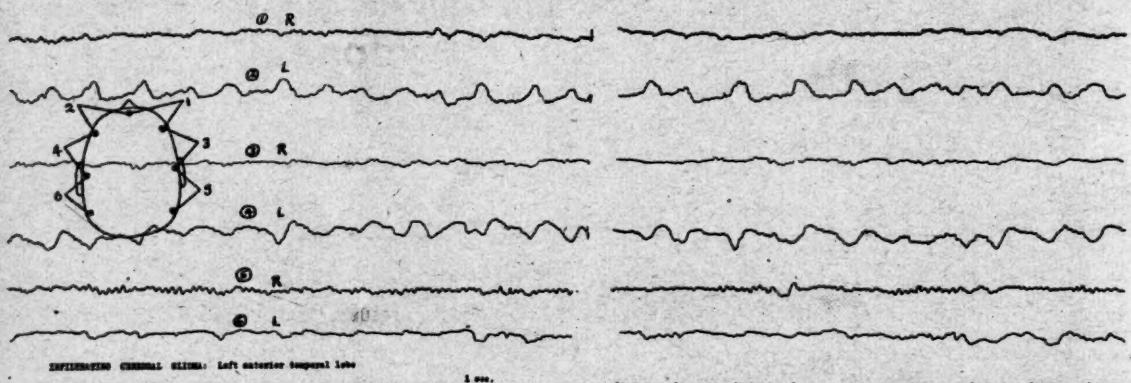


FIGURE XI.
Showing δ waves arising from an area surrounding an intracranial expanding lesion.

It is in all these groups of focal epilepsy that the electroencephalogram may provide invaluable aid. Not only may it give definite evidence of an epileptic process

whether the focus is pathologically likely to be a benign one or otherwise.

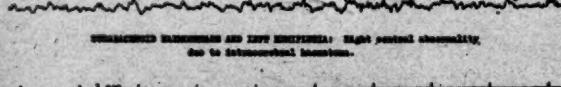
The more electroencephalographic studies that are carried out on epileptics, the more it becomes apparent that focal epilepsy is much more frequent than is generally supposed. In one Canadian study 38% of civilian epileptic patients had focal electroencephalographic abnormalities and in other series the figure has been even higher.

Briefly, one may state that the characteristic of the record is the presence of a local disturbance in the electroencephalogram which is detectable between fits—the so-called interseizure record. When the lesion is a benign and chronic one, such as a localized area of cerebral atrophy or scarring, the adjacent cortex is epileptogenic, and this is revealed in the electroencephalogram as a high voltage spike potential. These spikes are very conspicuous and emanate from only one circumscribed area (Figures VII and VIII).

The importance of electroencephalographic and clinical evidence that an epileptic attack is focal in nature is two-fold: (i) A full clinical assessment of the case is indicated in an attempt to determine the exact nature of the underlying lesion, and if necessary make further investigations. (ii) In severe or long-standing epilepsy poorly controlled by anti-convulsants, consideration may be given to surgical excision of the epileptic focus, which is often due to an old cerebral scar. Sometimes these scars result from previous head injury, infection, birth trauma *et cetera*, but often no evident cause can be elicited in the antecedent history (Figures IX and X).

FIGURE XII.
Electroencephalographic changes resulting from a cerebro-vascular lesion.

In a clinically doubtful case, but it may also provide fairly precise evidence of the actual anatomical location of the abnormal epileptic focus. It is also often possible to tell



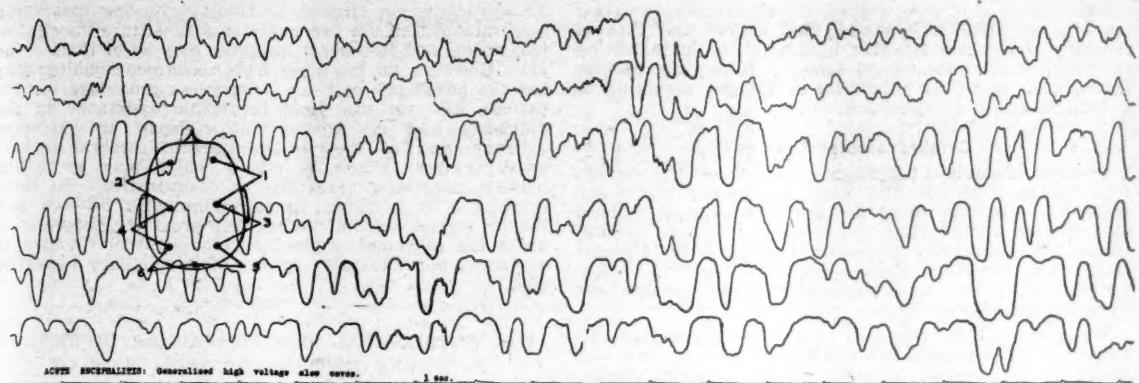


FIGURE XIII.
Acute encephalitis.

Comment.

In general, therefore, one can state that the electroencephalogram may be of invaluable aid in the full clinical assessment of epilepsy. It must be remembered,

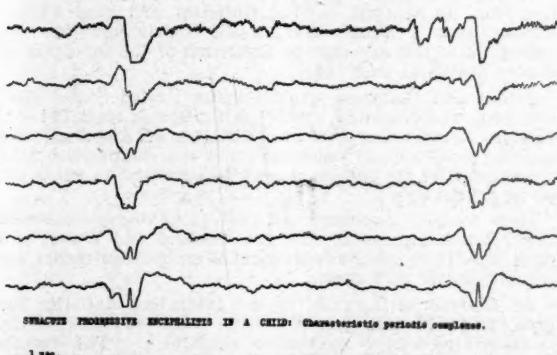


FIGURE XIV.
Subacute encephalitis.

however, as in any test, that it is not infallible, and that in a certain percentage of epileptics the electroencephalogram may be perfectly normal and the investigation must be integrated with the clinical data and other investigations.

Intracranial Expanding Lesions.

A cerebral neoplasm will interfere with the normal physiological state of the surrounding brain. This in turn may cause a pronounced local disturbance of the normal cortical electrical activity of the damaged tissues. This can be recorded by the electroencephalograph, and about 70% of all neoplasms occupying the cerebral hemispheres can be localized. The more malignant and infiltrating the tumour (such as a malignant glioma), the more likely is the electroencephalogram to be abnormal, whereas the more slowly growing and benign tumours, such as meningioma, produce slight or no change. The characteristic wave pattern seen is abnormal high voltage slow or δ waves arising from the affected area (Figure XI).

Cerebral abscesses (especially acute abscesses) produce severe changes in the electroencephalogram with the production of very high amplitude and very slow waves. So pronounced are these changes in cerebral abscess that if the electroencephalogram is normal it virtually excludes an abscess in a suspected case.

Head Injuries.

A closed head injury which has produced concussion will be reflected in the electroencephalogram by the appearance of generalized slow δ waves, indicative of depressed cerebral function. With clinical improvement these slow waves gradually diminish and normal rhythms appear. This return to normal may take place in a few minutes or a few days, depending upon the severity of the injury. However, as the general abnormality subsides a residual local abnormality may persist, and this clearly indicates that there has been some local cerebral damage or contusion. Such focal abnormalities have been obtained from the neighbourhood of superficial head injuries which were thought to be trivial, but which had produced slight but definite brain damage. It is in such areas of local damage that cerebral scarring may develop and subsequently form the basis (and often many years later) of an active epileptic lesion, producing post-traumatic epilepsy. Such a condition may be anticipated by finding outbursts of abnormal waves in the electroencephalogram after a head injury.

Subdural haematomata may produce definite changes in the electroencephalogram. Typically this change appears as an area of suppression of the normal cortical rhythms

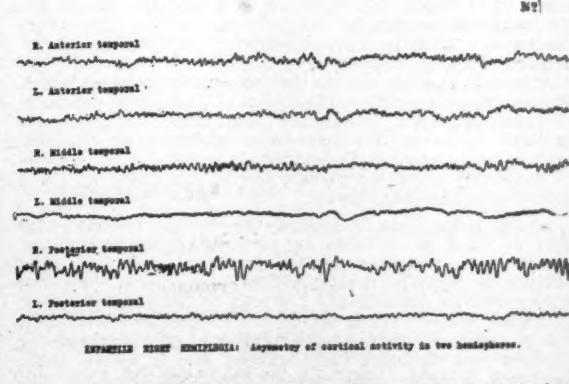


FIGURE XV.
Atrophy of the brain following infantile hemiplegia of long standing.

on the affected side due to the blanketing effect of the clot, which lies between the brain surface and the recording scalp electrodes.

Thus, in cases of head injury, the electroencephalogram may be of value in assessing the degree and rate of recovery of cerebral function in general, or in indicating the presence of residual focal damage. It may also provide information as to the possibility of epilepsy occurring as a post-traumatic complication.

Cerebrovascular Lesions.

In cases of cerebral thrombosis and embolus the changes seen in the electroencephalogram are usually slight and transient. In the early acute stage there is a local abnormality arising from the area of damaged cortical tissue, but this rapidly subsides. However, if the vascular lesion has produced bleeding with a resultant intracerebral clot, the electroencephalographic changes are more intense (Figure XII).

When some doubt exists as to whether the clinical and electroencephalographic findings are due to a cerebral neoplasm or a cerebral vascular accident, serial electroencephalograms may be useful, since the changes become progressively more pronounced when a tumour is present, whereas resolution tends to occur when a vascular lesion is present.

Inflammatory and Degenerative Diseases.

The many varieties of infection and degeneration that affect the brain diffusely may produce changes in the electroencephalogram of a varying degree. The actual changes in the electroencephalogram ultimately depend on the state of the affected cerebral neurons, and are a measure of disturbed cortical function and not an indication of the underlying aetiological processes. Dead cells send no messages, and the electroencephalogram is silent when an atrophic or inflammatory process has burnt itself out. However, when the cells are alive but damaged by the disease process, they produce abnormal rhythms and are detected by the electroencephalogram. As an illustration of a diffuse inflammatory disease affecting the brain, the rhythms in two examples of encephalitis, one acute and the other subacute, are shown in Figures XIII and XIV.

When the brain has proceeded to a state of atrophy there may be little spontaneous electrical activity. This is well seen in long-standing cases of infantile hemiplegia (Figure XV).

Conclusion.

In giving this brief summary of the value of the electroencephalogram in clinical practice, I am well aware of the many facets of electroencephalography which I have had to omit, or upon which I have not elaborated. For instance, I have not discussed the application of the electroencephalogram to clinical psychiatry. The chief reason for this is that electroencephalographic abnormalities seen in various conditions are less specific and less definite in their nature than in organic cerebral states. Thus, although a knowledge of the state of the cortical rhythms is useful in certain psychiatric problems—for example, some of the behaviour problems of children, aggressive psychopathy *et cetera*—in general great caution is necessary in coming to any precise conclusion from the electroencephalogram alone.

Again, I have not described the various methods that may be used to activate an underlying cerebral abnormality. The common method employed and used as a routine is hyperventilation, when alkalosis so produced may reveal an abnormality not seen in the resting record. Likewise, records taken whilst the subject is asleep or is being given an intravenous injection of "Metrazol" or exposed to a flickering light may be used in special cases, as these methods may reveal abnormal electrical discharges not otherwise seen.

Today, electrocorticography is also being used more and more, with records taken by electrodes placed on the exposed brain during operation for surgical excision of an epileptic focus.

These and many other aspects I am unable to discuss in the available time. But in conclusion, I can say that the electroencephalogram now occupies an accepted position in

its application to clinical problems involving disordered cerebral function. It can never be a substitute for clinical judgement, and in several instances may be of little or no aid. However, on the other hand, electroencephalography has the advantage of being a harmless procedure for the patient, and yet can yield invaluable assistance in the diagnosis and management of epilepsy or suspected epilepsy, and of the various organic cerebral lesions resulting from a host of agents which may be inflammatory, neoplastic, traumatic or degenerative. In these respects it is a clinical investigation with its own particular limitations and values, but providing information about the pathological physiology of cerebral function in a manner not obtainable by any other ancillary investigation.

THE AETIOLOGICAL SIGNIFICANCE OF DIFFERING PATTERNS IN THE AGE INCIDENCE OF CANCER MORTALITY.

By D. METCALF.¹

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It has long been known that the incidence of cancer, and consequently of deaths from cancer, increases with age.

In recent years, several workers have confirmed this fact from an analysis of vital statistics, and have demonstrated that a linear relationship exists between the logarithm of the age and the logarithm of the incidence of cancer deaths at that age.

Fisher and Hollomon (1951), using United States vital statistics, and Nordling (1953), using figures from Britain, France, Norway and the United States of America, have demonstrated that in those countries the relationship held true, and that the incidence was proportional to the sixth power of the age.

More recently Armitage and Doll (1954) have confirmed this relationship, using data for England and Wales, and have used their results to support a multi-stage theory for carcinogenesis in humans.

An analysis of the most recent Australian statistics has been made in this paper, in an effort to confirm the relationships under Australian conditions. The results obtained have closely paralleled the English findings.

The theoretical implications of these relationships, and more importantly of several deviations from the linear relationship, will be discussed.

Material and Methods.

The data used for the preparation of this paper were obtained from the Commonwealth Bureau of Census and Statistics publication *Demography* for the year 1952. This publication gives the figures for the Australian male and female population in five-year age groups from birth to ninety-five years. The causes of death are also listed, together with the number of males and females in each age group who died from these causes.

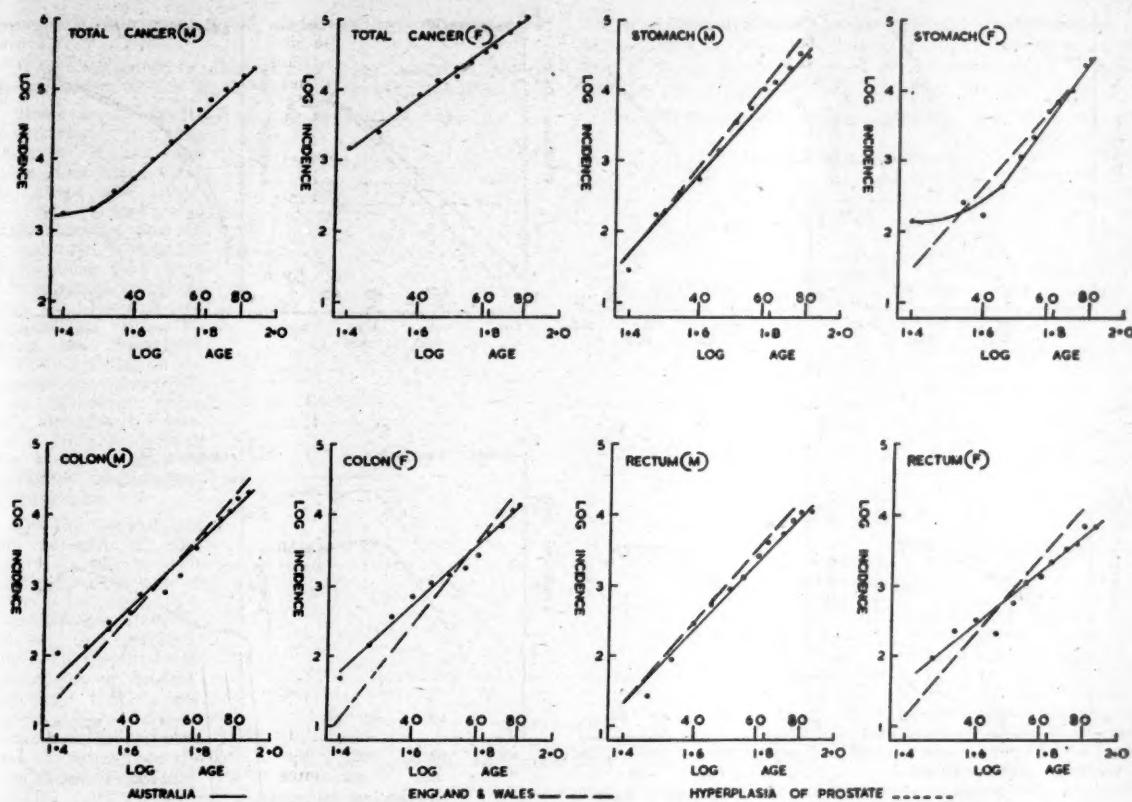
The following calculation was made in each case:

$$\text{Log. incidence per } 10,000,000 \text{ persons} = \text{Log. } \frac{\text{Number of deaths}}{\text{Total number in age group}} \times 10^7$$

Male and female figures were treated separately. Graphs were then constructed by plotting the logarithm of the first year in each age group against the logarithm of the incidence of the particular disease for each age group.

English curves were obtained from similar graphs constructed by Armitage and Doll (1954), who used figures for England and Wales for 1951. The English curves were then superimposed on the Australian graphs.

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FIGURES I to VIII.

The relationship between age and the incidence of death from cancer per 10,000,000 persons of that age: Australia, 1952; England and Wales, 1951; M, male, F, female.

It was found that the total number of deaths from several types of cancer, particularly in females, was so low that the figures were of no statistical value.

Similarly, the total number of deaths from various types of cancer, below the age of forty and above the age of eighty-five years, was so small that these figures were also omitted from the graphs.

Results.

As may be seen from Figures I to VIII, when the logarithm of the incidence of cancer deaths per 10,000,000 persons in any one age group was plotted against the logarithm of the age, a linear relationship resulted.

This was true for both males and females for total cancer deaths and for deaths from cancer of the stomach, colon and rectum.

It also held true in males for cancer of the prostate, mouth and pharynx, and pancreas (Figures IX to XI).

The gradient of this linear relationship is seen to lie between 5:1 and 6:1, and in each case it was found that, although the English graph closely paralleled the Australian graph, the English gradient was always slightly steeper.

Of special interest is the graph for cancer of the prostate (Figure IX). The onset of deaths from prostatic cancer is seen to be later than for other types of cancer and the gradient of the age: incidence line significantly steeper. Again, this closely paralleled the English figures. Also shown in this figure is the age:incidence curve for deaths from prostatic hyperplasia. The essential similarity of the curves is noteworthy and will be discussed later.

In contrast to the foregoing types of cancer, a second group was found which gave results deviating from the simple linear relationship. This group included cancer of the breast, cervix uteri and ovary in females and cancer of the lung in males.

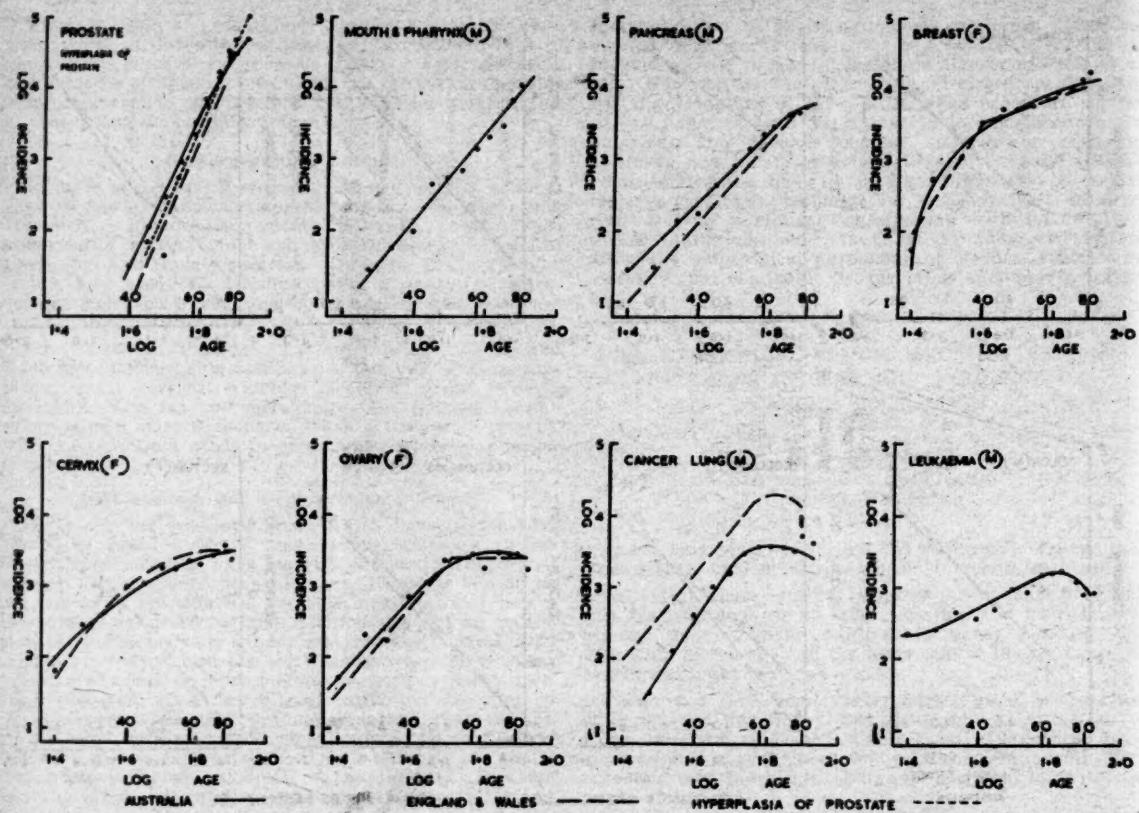
As may be seen from Figures XII to XIV, the results for cancer of the breast, cervix and ovary resembled one another, and were characterized by an initial linear relationship of similar gradient to the first group. However, this phase was followed by one in which the gradient decreased in slope, giving a flattening out of the graphs. This was most pronounced for cancer of the ovary (Figure XIV).

It will be observed that the respective ages at which these curves departed from the linear form are as follows: ovary, fifty years; breast, forty to forty-five years; cervix, forty to fifty years. The possible reasons for these departures will be discussed later.

Primary cancer of the lung (Figure XV) in males gave a different type of curve. Here the period of linear increase was followed by a flattening out and finally a falling off of the incidence in the higher age groups. This is seen more clearly in Figure XVII, which compares the mortality incidence for cancer of all sites with that of cancer of the stomach and lung.

The Australian figures for cancer of the lung in females were too small to allow an adequate graph to be constructed.

The Australian vital statistics are not complete enough to enable the cohorts for deaths from cancer of the lung at various age groups to be plotted. However, in an attempt to analyse the reason for the shape of the curve



FIGURES 1X TO XVI.

The relationship between age and the incidence of death from cancer per 10,000,000 persons of that age: Australia, 1952; England and Wales, 1951; M, male, F, female.

for cancer of the lung, cohorts were constructed for England and Wales by the use of figures from a paper by Kennaway (1953).

Figure XVIII shows that for each five-year cohort the incidence : age ratio is a linear one except in the older age groups, where there is again a suggestion of a flattening out of the graph. The linear portions of each cohort approximately parallel one another and also the standard age : incidence line for cancer. This figure also gives a striking demonstration of the increasing incidence of death from primary cancer of the lung.

The curves for deaths from leucemia in males (Figure XVI) and females appear to fall into a third group. Two peaks in incidence were found, one in childhood and one in late middle life.

Several other disease groups have been found to show a linear relationship when the logarithms of incidence of deaths were plotted against the logarithms of the age. Notable amongst these were arteriosclerosis, peptic ulcer and asthma. The significance of these findings will now be discussed.

Discussion.

It has been seen from the foregoing figures that in general the Australian figures closely parallel the English and Welsh figures for the relationship between age and cancer mortality.

It would appear that the linear logarithmic relationship between age and the incidence of deaths from cancer is a characteristic one for cancer.

The relationship becomes of some aetiological importance when it is realized that the incidence of cancer deaths closely parallels that of actual cases of cancer, owing to the uniformly short natural history of the disease.

Admittedly, a linear relationship also exists for several other diseases—asthma, peptic ulcer and arteriosclerosis. However, it is readily appreciated that the mortality figures for these diseases do not reflect the true incidence of the diseases for any one age group. The mortality figures are therefore of little value in any aetiological discussion.

The significance of the linear logarithmic relationship between cancer deaths and age cannot be fully appreciated at the present stage of our knowledge of the pathogenesis of the disease. Several attempts to interpret the phenomenon have been made by Nordling (1953), by Fisher and Holloman (1951), and by Armitage and Doll (1954).

The interpretation of Armitage and Doll most closely fits in with the data that have already been obtained from experiments in carcinogenesis in animals. These workers proposed that a linear relationship would obtain if the development of cancer depended on a sequential series of changes, each dependent for its occurrence upon the presence of the preceding changes.

If the probability of each change or stage occurring remained constant at all ages, then the logarithmic relationship between age and incidence would be expressible as a straight line, whose slope would depend on the number of sequential changes. If only one change was involved, then the curve would be a horizontal line. If two consecutive changes are concerned, then its slope will have a gradient of 1:1, and with an increase in the number of

necessary changes to n , the slope will have a gradient of $n-1:1$.

If this argument is taken at face value, cancer in general requires five or six stages before becoming manifest.

However, irrespective of any theoretical basis for the regularity, it may become of considerable heuristic value to adopt the linear relationship as characteristic for all cancers in which the aetiological factors are constantly present and have remained so throughout the life span of the individuals making up the population concerned; and wherever there are significant deviations from it to look for special factors of possible aetiological significance.

To take the example of cancer of the ovary, it will be seen that, after the age of fifty years, there is a remarkable flattening out of the gradient. On the multi-stage hypothesis of carcinogenesis, this could result from the cessation of occurrence of the penultimate step in carcinogenesis.

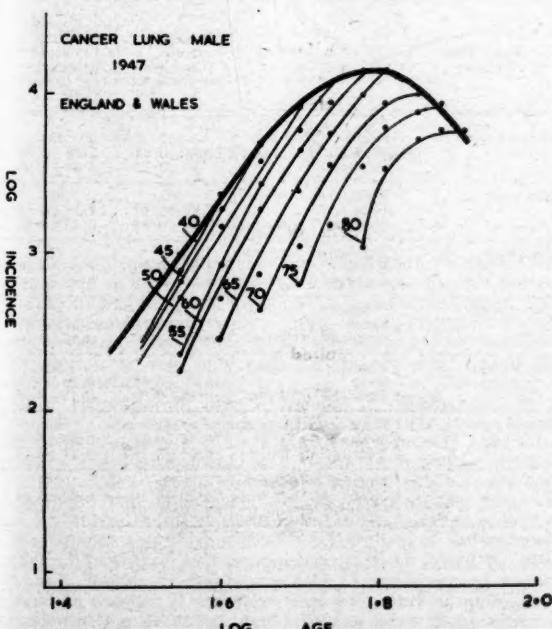


FIGURE XVIII.

The incidence of male deaths from cancer of the lung in England and Wales, 1947. Heavy line, total lung cancer deaths, 1947; light lines, lung cancer deaths in five-year cohorts for the period from 1920 till 1947. Numbers indicate age in 1947.

No new cases of early stage carcinomas would be appearing; but of those women whose ovaries had already reached that stage in the development of manifest cancer, a fixed ratio would proceed to the final stage per unit time.

The incidence curve would therefore alter from one of steady linear increase and become horizontal. Since ovarian hormones are known to play a part in experimental carcinogenesis, the suggestion is strong that the diminution in reproductive activity occurring at this time is responsible for this interruption in carcinogenesis, and for the striking alteration in the incidence of ovarian cancer after the age of fifty years.

Similar reasoning may be applied to the curves for cancer of the breast and *cervix uteri*.

The curve for primary cancer of the lung probably results from a different cause. As has been shown above, the present shape of the curve is the result of the compounded effect of a series of parallel linear gradients. The linear gradients having the highest absolute figures are those of the youngest age groups.

This finding would indicate that the younger age groups have experienced a new situation resulting in a more rapid development of the condition of active respiratory cancer. Taken with the studies of Doll and Bradford-Hill (1952), these graphs provide further evidence for the importance of the twentieth century increase in cigarette smoking as the main element responsible for the deviation of the incidence:age relationship from the linear form.

The sharp gradient for the incidence:age ratio for cancer of the prostate and hyperplasia of the prostate is of considerable interest. The prostate would seem to be an organ which is most susceptible to the development of neoplasia with advancing age. This is supported by the high incidence of minute foci of carcinomatous tissue in the prostate demonstrable during routine post-mortem examinations. The striking similarity of the gradients for prostatic cancer and prostatic hyperplasia would indicate some basic similarity in part, at least, of their pathogenesis.

Finally, a consideration of the age:incidence curves as a whole gives some grounds for supposing that more than one mechanism for carcinogenesis exists in humans. It may prove of some value to focus therapeutic investigation on those types showing variation from the standard linear age-incidence relationship.

Summary.

1. An analysis of Australian vital statistics has confirmed the English findings of a linear relationship between the logarithms of age and of the incidence of cancer deaths at that age.

2. There is a striking variation from this linear relationship for cancer of the lung, ovary, breast and *cervix uteri*.

3. The aetiological implications of these relationships are discussed.

Acknowledgements.

I am indebted to Sir Macfarlane Burnet, F.R.S., for his helpful advice and criticism, and to Miss J. Lowe for her assistance with the figures.

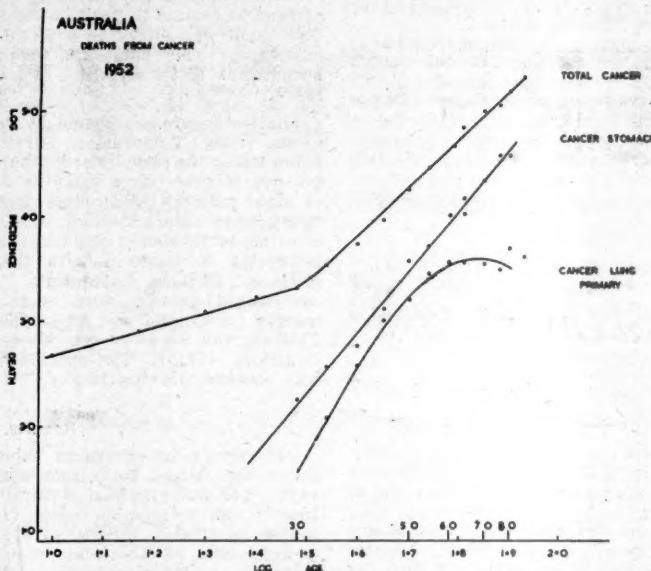


FIGURE XVII.
The incidence of male deaths from cancer of the lung compared with total cancer deaths and deaths from cancer of the stomach.

linear gradients. The linear gradients having the highest absolute figures are those of the youngest age groups.

This finding would indicate that the younger age groups have experienced a new situation resulting in a more rapid development of the condition of active respiratory cancer. Taken with the studies of Doll and Bradford-Hill (1952), these graphs provide further evidence for the importance of the twentieth century increase in cigarette smoking as the main element responsible for the deviation of the incidence:age relationship from the linear form.

The sharp gradient for the incidence:age ratio for cancer of the prostate and hyperplasia of the prostate is of considerable interest. The prostate would seem to be an organ which is most susceptible to the development of neoplasia with advancing age. This is supported by the high incidence of minute foci of carcinomatous tissue in the prostate demonstrable during routine post-mortem examinations. The striking similarity of the gradients for prostatic cancer and prostatic hyperplasia would indicate some basic similarity in part, at least, of their pathogenesis.

Finally, a consideration of the age:incidence curves as a whole gives some grounds for supposing that more than one mechanism for carcinogenesis exists in humans. It may prove of some value to focus therapeutic investigation on those types showing variation from the standard linear age-incidence relationship.

Summary.

1. An analysis of Australian vital statistics has confirmed the English findings of a linear relationship between the logarithms of age and of the incidence of cancer deaths at that age.

2. There is a striking variation from this linear relationship for cancer of the lung, ovary, breast and *cervix uteri*.

3. The aetiological implications of these relationships are discussed.

Acknowledgements.

I am indebted to Sir Macfarlane Burnet, F.R.S., for his helpful advice and criticism, and to Miss J. Lowe for her assistance with the figures.

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Hæmoglobin and Plasma Protein Values in the Puerperium.

By R. J. WALSH, BRUCE T. MAYES AND D. SUGERMAN,
From the New South Wales Red Cross Blood Transfusion Service, Sydney, The Department of Obstetrics in
The University of Sydney, and the King George V Memorial Hospital, Sydney.

It is well known that hydremia occurs during pregnancy, producing a progressive reduction of the hæmoglobin value (Walsh, Arnold, Lancaster, Coote and Cotter, 1953) and of the plasma protein values (Coryell, Beach, Robinson, Macy and Mack, 1952). Bensted and Theobald (1952) have stated that administration of therapeutic doses of iron throughout pregnancy prevents the decrease in hæmoglobin values; but Widdowson (1939) noted that if iron therapy is discontinued the values return to those of the control group. It is not known whether ingestion of a diet very rich in protein will prevent the decrease in plasma protein values. These considerations, however, are largely of academic interest, because in practice the changes do occur, and up to the present no evidence has been produced to suggest that they have undesirable effects. Towards the end of pregnancy, and coincidentally with the period of weight loss, the hæmoglobin values increase, but at term they are still significantly less than those of non-pregnant women of comparable age.

There appears to be little information concerning the rate of recovery of the hæmoglobin and plasma protein values after delivery of the infant. For clinical purposes it is generally assumed that they should have returned to the non-pregnant levels in six weeks. The present investigation was undertaken to test the validity of this assumption.

Methods and Materials.

At first an attempt was made to obtain blood samples from patients twenty-four hours after delivery and then at weekly intervals until the sixth week. This plan required frequent visits of parturient women to hospital for non-essential tests, and soon proved incompatible with the domestic life of the subjects. It was accordingly modified and the patients were grouped as follows: Group A—53 patients who, when available, were tested twenty-four hours, one week, three weeks and six weeks after delivery; Group B—46 patients who were tested, as far as possible, two weeks and six weeks after delivery; Group C—51 patients who were tested usually four weeks and six weeks after delivery; Group D—40 patients who were asked to return for tests five weeks and six weeks after delivery. As the results show, it was found impossible to obtain attendance of all these patients at the required times; but it is believed that a sufficient number of women have been tested at different intervals to permit analysis of the results.

Consecutive patients were included in the survey, the only point of selection being that patients who had been given blood transfusions were excluded.

The blood samples were collected at King George V Memorial Hospital for Mothers and Babies, Sydney. Approximately five millilitres of blood were obtained from each subject with a sterile dry needle and syringe. Care was always taken to avoid prolonged venous stasis during collection, and in no instance was the venous tourniquet allowed to remain in position for more than thirty seconds. The blood was mixed in a test tube with the crystals of ammonium and potassium oxalate resulting from the evaporation of 0.2 millilitre of a 10% solution (Wintrrobe, 1947).

The tests were performed at the New South Wales Red Cross Blood Transfusion Service. Immediately before being tested the samples were thoroughly mixed by rotation for five minutes on a machine designed to mix dilutions of blood prior to erythrocyte counting (Dacie, 1949). The hæmoglobin determinations were made on a photo-electric colorimeter (Walsh *et alii*, 1953), which had been previously calibrated to conform with the standardization of the National Physics Laboratory. Protein estimations on centrifuged plasma were made by the specific gravity method, with the use of copper sulphate solutions of Phillips, van Slyke *et alii*, as described by Simmons and Gentzkow (1944). The specific gravity of every solution was checked gravimetrically.

Results.

The results are shown in Table I and Figure I. In the latter the dotted lines represent the mean hæmoglobin values for non-pregnant Australian women aged between twenty and thirty-nine years (13.89 grammes) as determined by Walsh *et alii* (1953), and the mean plasma protein value of Australian female blood donors as determined by the copper sulphate method (6.16 ± 0.23 gramme).

TABLE I.
Hæmoglobin and Plasma Protein Values (Grammes per Hundred Millilitres) During the Puerperium.

Time After Delivery.	Results.	Hæmoglobin Value, (Grammes per Centum.)	Plasma Protein Content, (Grammes per Centum.)
First 24 hours ..	Number of subjects Mean Standard deviation	43 12.72 ± 0.23 1.53 ± 0.17	43 5.95 ± 0.09 0.60 ± 0.06
One week ..	Number of subjects Mean Standard deviation	38 14.06 ± 0.20 1.23 ± 0.14	38 7.17 ± 0.70 0.43 ± 0.05
Two weeks ..	Number of subjects Mean Standard deviation	41 14.21 ± 0.19 1.24 ± 0.14	41 7.06 ± 0.06 0.40 ± 0.04
Three weeks ..	Number of subjects Mean Standard deviation	45 14.55 ± 0.18 1.20 ± 0.13	42 6.67 ± 0.06 0.36 ± 0.04
Four weeks ..	Number of subjects Mean Standard deviation	37 13.80 ± 0.12 0.97 ± 0.09	36 6.20 ± 0.08 0.45 ± 0.05
Five weeks ..	Number of subjects Mean Standard deviation	44 13.66 ± 0.15 0.98 ± 0.10	42 6.39 ± 0.07 0.44 ± 0.05
Six weeks ..	Number of subjects Mean Standard deviation	32 13.70 ± 0.10 0.92 ± 0.07	76 6.49 ± 0.04 0.31 ± 0.03
Seven weeks ..	Number of subjects Mean Standard deviation	21 13.82 ± 0.26 1.19 ± 0.18	21 6.53 ± 0.06 0.28 ± 0.04

To test the significance of differences between the hæmoglobin values, χ^2 was calculated from the results by dividing the sum of squares of the mean about the grand mean (13.74 grammes) by an estimate of the variance. A value of 68.014 for seven degrees of freedom was obtained, giving a value for P of less than 0.01. It is apparent that this

significant variation is due to three factors: firstly to the low mean value obtained in the first twenty-four hours; secondly to the rapid increase during the first seven days, with values rising above the mean of the controls and reaching a maximum at the end of the third week; and thirdly to a return of the values to those of non-pregnant women during the fourth week.

A similar analysis was made of the plasma protein values, and it was found that χ^2 equalled 274.06 for seven degrees of freedom. This very significant variation is due to a pronounced increase during the first seven days, followed by a gradual decrease to the end of the fourth week and a subsequent increase during the fifth, sixth and seventh weeks.

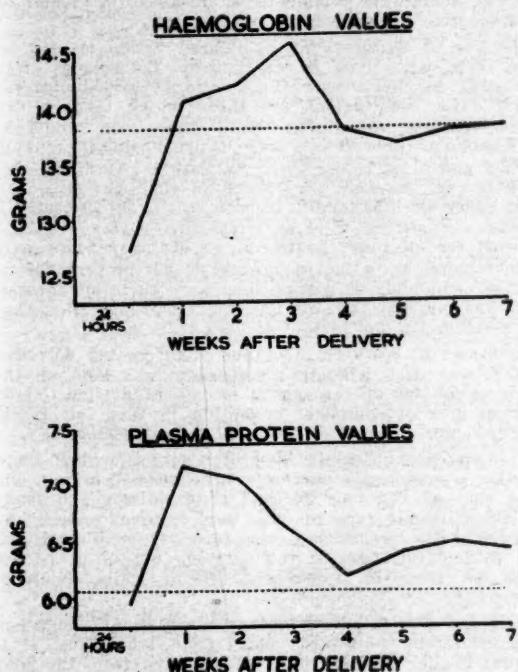


FIGURE 1.

Discussion.

The results presented in this paper indicate that there is a rapid recovery of both haemoglobin and plasma protein values during the first week of the puerperium, when both values become greater than those of non-pregnant women of comparable age. This cannot be explained by enhanced production of red cells and plasma proteins during the early part of the puerperium, but must be the result of rapid reduction of the hydremia of pregnancy. It is unlikely to be due to passage of fluids into the tissue spaces or to be the result of lactation; it is probably associated with a negative fluid balance due to an increased urinary output. As far as the writers are aware, this has not been recorded. The amount of fluid that must be lost from the extracellular fluid to produce the changes recorded in haemoglobin and plasma protein values would not be great, and an increased urinary excretion could easily be overlooked. Values greater than those of non-pregnant women could be reached if excessive fluid was excreted and haemoconcentration produced; but it seems more likely that the high haemoglobin values reflect the additional red cell production which occurs during pregnancy (Gibson, 1949). The same may be true of the plasma protein values.

The practical application of these findings is that both the haemoglobin and plasma protein values should have returned to normal by the seventh day. This information

should facilitate diagnosis and, if required, treatment of puerperal anaemia.

Dr. S. P. Bellmaine has attempted to correlate the figures in this paper with the success or otherwise of lactation. No definite results have yet been obtained from this analysis.

Summary.

The haemoglobin and plasma protein concentrations were determined in a group of women during the puerperium. The hydremia which is evident during pregnancy disappears very rapidly, and by the end of the first week both values were slightly greater than those observed in non-pregnant women of comparable age. The changes are thought to be the result of a reduction in the plasma volume following increased urinary excretion. They are important in the diagnosis of puerperal anaemia.

Acknowledgements.

The writers wish to acknowledge their indebtedness to Sister H. Cotter, who performed the haemoglobin estimations, and to Mrs. I. Brading, B.Sc. (London), who performed the plasma protein estimations.

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SOLVENT HAZARDS IN THE DRY-CLEANING INDUSTRY.

By R. G. BOURNE,
Medical Student, University of Queensland.

GREAT expansion has occurred in the dry-cleaning industry in recent years. There are two hazards associated with the solvents used—(i) contact dermatitis, (ii) inhalation effects. Owing to the processes used in Australia, the latter is almost unknown here. Information submitted has been gained from visits to shops in south-east Queensland only, but the management, processes and related factors differ little throughout the Commonwealth. The solvents and processes used, and the prevention and treatment of their hazards, form the subject of this paper.

Solvents.

Medically speaking, the solvents used fall into two main classes: (i) petroleum derivatives, and (ii) chlorinated hydrocarbons.

The petroleum derivatives used include the following: white spirit, composed of mixed hydrocarbons—boiling point 150° to 210° C.; Stoddart's solvent, composed of mixed hydrocarbons—boiling point 300° to 400° C.; cleaners' naphtha—maximum allowable concentration 1000 parts per million of air for each.

The chlorinated hydrocarbons used include the following: (a) carbon tetrachloride (CCl_4); boiling point 77° C., maximum allowable concentration 100 parts per million of air; (b) trichlorethylene (C_2HCl_3); boiling point

87° C., maximum allowable concentration 200 parts per million of air; (c) Perchlorethylene (C_2Cl_4); boiling point 119° C., maximum allowable concentration 200 parts per million of air.

White spirit is almost the universal dry-cleaning agent used. It is superior to the chlorinated hydrocarbons for the following reasons: (a) it vaporizes less readily (note the boiling point); (b) it has a lower toxicity (note the maximum allowable concentration); and (c) it costs much less. Because of factors (a) and (b), provided reasonable precautions are taken, the likelihood of systemic effects due to inhalation of vapour is almost nil with white spirit, but quite considerable with the chlorinated hydrocarbons. This was proved by a survey in Pennsylvania in 1947. Sixty-six establishments using chlorinated hydrocarbons were investigated, and of these 12 were in a dangerous state; but the 90 premises using white spirit were completely free of troublesome concentrations of vapour. Although chlorinated hydrocarbons in dangerous concentrations have serious effects on liver and kidney, they will be mentioned only briefly in this paper as they are not used in Queensland and only to a very limited extent in the southern States.

Processes.

For a full understanding of the hazards and their prevention, it is necessary that the processes involved be known.

White Spirit.

The clothes are first marked for future identification and then moved to the dry cleaner, who is the only man in the establishment who comes in contact with the solvent. He takes a bundle of clothes and drops them into the "washer". This is a rotating drum, generally about nine feet long, through which white spirit is flowing continuously. The white spirit is filtered as it is used and returned once more to the "washer". After the clothes have been in the "washer" for about twenty minutes, they are removed and transported to the "hydro", which is like a spin drier and removes most of the solvent from the clothes. It is while the clothes are being removed from the "washer" and transported to the "hydro" that the contact with the solvent takes place. When the clothes are removed from the "hydro" they are almost dry, and they are then taken to the "deodorizer", where the last of the solvent is removed. On removal from the "deodorizer" the clothes, which are practically sterile, are searched for stains, and any stained garment is set aside for the "spotter", who removes the stains with special solvents which are discussed later.

All clothes are now clean and free from stains, and are sent to the ironing machines, after which they are ready for the customer.

Chlorinated Hydrocarbons.

During this investigation there was no opportunity of observing chlorinated hydrocarbons in use. In principle the whole process is enclosed, the operator being protected as far as possible from contact with the solvent or its vapour.

Prevention of Hazards.

White Spirit.

Cutaneous Effects.—The basis of prevention is to avoid contact of the solvent with the operator's skin. As was stated above, contact takes place when clothes are lifted from the "washer" to the "hydro". Methods which can be used to minimize such contact are as follows:

The Use of Machinery. In most of the shops visited the clothes were lifted out of the "washer" by hand, placed on a trolley, wheeled to the "hydro" and there lifted from the trolley, a process involving much contact. However, in one shop a modification was used which did appear to be a definite advance. A stainless steel trough running direct from the "washer" to the "hydro" had been fitted, so that clothes were merely pushed along the trough into the "hydro". This modification decreases the possibility

of contact, saves time and money, and in addition can be fitted to existing equipment for little additional cost. It is strange that the manufacturers of dry-cleaning machines have not themselves produced a machine to avoid unnecessary handling and wastage of time and solvent. Such an arrangement would solve the whole problem.

Wearing of Gloves. Although in theory gloves are an answer to the problem of dermatitis, they have certain disadvantages. Special plastic gloves have to be used, and these are expensive; they are said to cost about 28. 10s. a pair. They stiffen and crack fairly soon, and one small hole makes them useless. In addition they are hot and uncomfortable to wear and give a decreased sensation of touch, so that many of the operators would rather risk dermatitis than wear them. However, if an operator does not wear them he is certain to be affected to a greater or lesser degree.

The Use of Barrier Cream. Barrier cream is used by most shops with more or less success, the success often depending on how conscientiously the worker applies the cream. The best creams are those which leave a dry solvent-repellent film on the skin. The cream should be applied two or three times a day, the arms being thoroughly washed and dried before each application. At night after work is over, workers should use an emollient cream on their hands, such as lanolin 70 parts, castor oil 30 parts. A vegetable oil cleanser such as sulphonated castor oil should be used for cleaning the hands, as ordinary soaps only remove more fat. Although creams do not prevent dermatitis as completely as gloves, they have their advantages. They are not expensive or uncomfortable, and often they are more acceptable to the workers than gloves.

Rotation of Workers. At one shop visited a roster system was used whereby an operator was kept on the cleaning job for only a month or two at a time. There was no idea of complete prevention in this, but it did give the skin a chance to return to normal periodically.

Preemployment Examination. It is very difficult to know whether a prospective worker will be affected or not, and trial may be the only method of deciding. The many variables include type of skin, sex, trauma, presence of other skin diseases, climate, age, race, psychic disturbance, and conscientiousness in the carrying out of preventive measures. However, people with thin dry skins should be kept away.

Systemic Effects.—Good natural ventilation is sufficient to prevent any untoward effects from inhalation. It is helpful if the "washer" is set fairly high from the floor, so that the dry cleaner works beside it rather than over it when solvent-impregnated clothing is removed.

Chlorinated Hydrocarbons.

As was stated previously, the process must be completely enclosed. This can best be attained if the plant is built specially by a trusty manufacturer. In addition a definite routine must be set up for the working man, no smoking, no loitering and no eating of lunches in the dry-cleaning rooms being allowed. Hence continual vigilance of both work and plant is required. Adherence to these rules brings safety.

"Spotting."

Before this section on prevention is concluded, a brief word will be given on "spotting", that process by which stains are removed. Many potentially dangerous volatile materials, such as carbon tetrachloride, benzol and carbon bisulphide are used. There have been no recorded deaths of "spotters" in Australia, and probably this is because there are no large establishments sufficiently highly organized to require a number of "spotters" to work together. Generally there is only one "spotter" to a shop and his work is often not continuous, so that a dangerous concentration of vapour does not build up. In addition, stoppered bottles and not open bowls are used, and good general ventilation is the rule. Local exhaust ventilation, together with good general ventilation, is of great value if danger is thought to exist.

Diagnosis and Treatment.

Dermatitis.

A full industrial history should be taken. It should be determined that the patient does actually handle the solvent, that the dermatitis has appeared since he has handled the solvent, and that the condition is relieved when he is away from work. The most common skin condition associated with such a history is pustular dermatitis. Small pustules are found round the hair follicles of the hands and forearms. The intervening areas are dry, sometimes red, particularly the webs of the fingers. Vesicles may also occur, and where they are present are generally purulent. Basically this typical appearance is due to a maceration of the skin caused by the removal of fat by the solvents, followed by secondary infection. Boils and carbuncles may develop. Occasionally the skin is fissured as well as dry, particularly in the palms and webs of the fingers. Both types may occur together. The fissuring type is the one most commonly described overseas. The diagnosis is made on the history and clinical appearance.

Total removal from the solvent is the only means of complete cure. When the dermatitis is severe this has to be done, and the management generally finds such a man employment in another part of the establishment. With less severe affection, simple "soaks" and dressings are required if pustules and vesicles predominate; but finally when the condition has cleared, a simple lanolin cream is needed to relieve the dryness. Nightly application of such a cream, together with greater attention to preventive measures, will limit the process. It is necessary to realize that the milder type of dermatitis does not worry the dry cleaner unduly, and many workers accept it as part of the job.

Systemic Effects.

A history of exposure to chlorinated hydrocarbons, and the finding of the clinical features of liver and kidney damage, are the diagnostic features. Total removal of the patient from exposure, treatment of the liver and kidney damage and a careful check of the whole process by an industrial expert are then required, as such exposure can be fatal.

Summary.

1. Solvents and processes used in dry cleaning are described. White spirit is the solvent in general use.

2. Prevention of hazards is discussed. It is suggested that suitable machinery would not only prevent dermatitis, but save time and money. The value of complete prevention by gloves is decreased by their expense and the discomfort they cause. Barrier creams properly applied are of definite value.

3. Diagnosis and treatment are described.

Acknowledgements.

I should like to thank Dr. Douglas Gordon, of the Department of Health and Home Affairs, for his guidance and suggestions, Mr. S. C. Trott of the Chamber of Manufacturers, Brisbane, whose letter of introduction enabled me to visit the establishments, and finally the managers of these establishments for their courteous cooperation.

Reports of Cases.

OPIUM POISONING PRECIPITATED BY CHLORPROMAZINE.

By DOUGLAS ANDERSON, M.D.,
Sydney.

A MAN, aged sixty-two years, had recently become slightly jaundiced and complained of recurrent abdominal pain, the cause of which was under investigation. He also suffered from alcoholic cirrhosis of the liver of long standing. The liver had been much enlarged before the

onset of jaundice, and great impairment of its function had been demonstrated. On three occasions in a fortnight his pain was relieved by a dose of one-third of a grain (20 milligrammes) of papaveretum ("Omnopon") given by mouth. This was well tolerated.

On a fourth occasion he received the same dose of papaveretum for pain and was still complaining two and a half hours later. A tablet of 25 milligrammes of chlorpromazine hydrochloride ("Largactil") was now given in the hope that it would enhance the effect of the dose of papaveretum, which it was thought inadvisable to exceed. It evidently did so within half an hour.

Two hours after taking the chlorpromazine he was reported to be fast asleep and breathing very slowly and stertorously. An hour later still he was found to be semicomatose, clammy, hardly breathing at all, cyanotic and with pin-point pupils. An intravenous injection of 20 milligrammes of nalorphine hydrobromide ("Lethidrone") was given at once and followed by the same amount intramuscularly. This had very much less effect than might have been expected; but there was distinct improvement in the rate and depth of respiration over the next quarter of an hour or so, and it became possible to rouse him for a moment by painful stimuli or by shaking his shoulder. The nalorphine was followed by other forms of treatment—purgation, and the administration of oxygen, potassium permanganate, penicillin, an enema and a further 20 milligrammes of nalorphine.

The opium poisoning was succeeded during the next four hours or so by a restless, very confused state with twitchings of the face and hands and rigidity of the limbs. Transient weakness of one side of the face was observed. These symptoms were thought to be due to impending liver failure. Without delay glucose and amino acid solution ("Parenamine") were given intravenously and simultaneously. Over the next three days he gradually recovered and became as well as he was before the papaveretum was given.

It has long been thought inadvisable to give much opium or morphine to persons suffering from liver damage. It appears from the present case that chlorpromazine in the presence of impaired liver function may convert an ordinary dose of opium into a dangerously excessive one. Chlorpromazine and nalorphine may also have some harmful effects of their own upon the damaged liver.

OVARIAN PREGNANCY FOLLOWING UNILATERAL OOPHORECTOMY.

By W. J. RAWLINGS,
Melbourne.

THIS case is reported as a plea for conservative ovarian cystectomy, and to illustrate the difficulty which may arise from previous radical operation on a young woman.

The patient, aged thirty years, was examined in consultation on October 16, 1953. In 1948 she had had an uneventful pregnancy and labour resulting in a full-time live child. In 1953 at twenty-eight weeks' gestation she was delivered of twins which did not survive labour. Post-confinement examination disclosed a cyst of the right ovary. The mother was most anxious for further pregnancies, so in August, 1953, right salpingo-oophorectomy and appendicectomy were performed in a provincial centre. On the second post-operative day (August 5, 1953) menstruation commenced at its usual time. Coitus occurred on the fifteenth day of the menstrual cycle and was succeeded by amenorrhoea until September 29, when a blood loss *per vaginam* was evident—the discharge being more brown than red; this continued for three days and terminated in colicky abdominal pain and the passage of what was probably a cast of the uterus. The pain then ceased, but a brownish-red vaginal discharge continued until October 15, when the patient suffered a painless heavy loss of red blood *per vaginam*.

When she was examined on the next day (October 16, 1953) a round mass about two inches or more in diameter was felt in the left fornix; it was not tender, and was not freely mobile. The pulsation of the uterine artery on the left side was easily felt. Ectopic pregnancy was diagnosed.

Laparotomy, performed the same day, disclosed a left ovarian pregnancy in the one remaining ovary. Enucleation of the mass—as in ovarian cystectomy—was performed as far as possible, and the remnants of ovarian tissue were enfolded and sutured.



FIGURE 1

Dr. H. F. Bettinger reported that pathological examination revealed the following findings:

A moderately well-encapsulated haemorrhagic mass measuring 6 x 5 x 4.5 cms. containing a centrally situated chorionic vesicle 1.5 cms. in diameter. The latter contains a small quantity of blood and an embryo 0.75 cm. in length. The capsule of tissue surrounding the haemorrhagic mass is of ovarian origin and contains scattered Graafian and atretic follicles, and follicular cysts. This tissue is congested, oedematous and inflamed and shows decidual change and trophoblastic cell invasion. The blood clot contains immature placental tissue showing moderate trophoblastic activity. Ovarian pregnancy.

Convalescence after operation was uneventful. Presumably owing to the small amount of disorganized ovarian tissue left, the menses occurred very irregularly and at long intervals until March, 1954, since when the patient has established a regular twenty-four day cycle instead of her previous twenty-eight day cycle. No further pregnancy has occurred. Thus this young woman, aged thirty years, anxious to have a larger family, nearly suffered a surgical menopause, whereas previous ovarian cystectomy would have ensured a large amount of functioning ovarian tissue.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Medical Clinics of North America"; 1955. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. Chicago Number. 9" x 6", pp. 340, with 70 illustrations. Price: £6 per annum with paper binding and £7 5s. per annum with cloth binding.

Consists of a symposium on clinical advances in medicine—21 articles with a foreword by 39 contributors.

"Medical Greek and Latin at a Glance", by Walter R. Agard, B.Litt. (Oxon.), and Herbert M. Howe, Ph.D.; Third Edition; 1955. New York: Paul B. Hoeber, Incorporated. 9" x 6", pp. 96. Price: \$1.85.

Intended for those who have no knowledge of Greek or Latin when they become medical students.

"Cardiac Anomalies: A Clinicopathologic Correlation", by Vincent Moragues, M.D., and Chester P. Lynxwiler, M.D.; 1954. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 11" x 9", pp. 102, with 157 illustrations. Price: 70s.

Intended for the medical student, the paediatrician and the general practitioner.

"Clinical Neurosurgery: Proceedings of the Congress of Neurological Surgeons, New Orleans, La"; Editor-in-Chief, Raymond K. Thompson, M.D.; 1955. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 6", pp. 210, with 89 illustrations. Price: 86s.

Contains three chapters by Sir Geoffrey Jefferson and three panel discussions.

"Atlas of Tumor Pathology" (Washington: Armed Forces Institute of Pathology). Section II—Fascicle 5: "Tumors of the Soft Tissues", by Arthur Purdy Stout, M.D.; 1953. 10" x 8", pp. 138, with 78 illustrations. Price: \$2.00. Section IV—Fascicle 11: "Tumors of the Major Salivary Glands", by Frank W. Foote, junior, M.D., and Edgar L. Frazell, M.D.; 1954. 10" x 8", pp. 150, with 184 illustrations. Price: \$1.50. Section VI—Fascicle 21: "Tumors of the Stomach", by Arthur Purdy Stout, M.D.; 1953. 10" x 8", pp. 104, with 66 illustrations. Price: \$1.75. Section VI—Fascicles 23 and 24: "Tumors of the Retroperitoneum, Mesentery and Peritoneum", by Lauren V. Ackerman, M.D.; 1954. 10" x 8", pp. 136, with 105 illustrations. Price: \$1.50.

Some members of this series have already been reviewed in this journal.

"Clinical Bacteriology", by E. Joan Stokes, M.B., B.S., M.R.C.P., M.R.C.S., with a foreword by A. A. Miles, C.B.E., M.B., F.R.C.P.; 1955. London: Edward Arnold (Publishers) Limited. 9" x 6", pp. 296, with 25 illustrations. Price: 20s.

Intended for pathologists, bacteriological technicians, clinicians, resident medical officers and those responsible for the protection of patients from pathogenic bacteria.

"X-Ray Atlas and Manual of Esophagus, Stomach and Duodenum", by T. J. J. H. Meuwissen, with an introduction by Robert D. Moreton, M.D., F.A.C.R.; 1955. Amsterdam: Elsevier Publishing Company. London: Cleaver-Hume Press, Limited. 11" x 8", pp. 702, with 1201 illustrations. Price: £8 15s.

An atlas with case histories.

"History of the Second World War: United Kingdom Medical Series"; Editor-in-Chief, Arthur S. MacNalty, K.C.B., M.A., M.D., F.R.C.P., F.R.C.S.; "The Civilian Health and Medical Services", edited by Arthur Salisbury MacNalty, K.C.B., M.A., M.D., F.R.C.P., F.R.C.S.; 1955. Volume II: The Colonies, The Medical Services of the Ministry of Pensions, Public Health in Scotland, Public Health in Northern Ireland. London: Her Majesty's Stationery Office. 9" x 6", pp. 418. Price: 45s.

This volume completes the section of the "History" dealing with the civilian health and medical services.

"Animal Agents and Vectors of Human Disease", by Ernest Carroll Faust, M.A., Ph.D.; 1955. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9" x 6", pp. 660, with 225 illustrations, one in colour. Price: £5 6s.

Intended to be of use to the zoologist, epidemiologist, pathologist, clinician, laboratory diagnostician and public health worker.

The Medical Journal of Australia

SATURDAY, JUNE 11, 1955.

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SOCIAL SCIENCE AND MEDICINE.

THE time has long passed when a medical practitioner was concerned only with an illness, such as an infection, and his patient's reaction to it. He now knows that he has to deal with the patient, living and working among others, having an effect on his surroundings and his personal contacts and being affected by them, and basing his philosophy of life, his whole mental outlook, on his accumulated experience. Practitioners of medicine are not the only group in the community who are learning, indeed who have to learn, to adopt this wide perspective. Among those in America who realized this was Mrs. Russell Sage, who in 1907 established the Russell Sage Foundation "for the improvement of social and living conditions in the United States of America". In 1949 the Russell Sage Foundation announced "its current program for the improvement of the utilization of research in the social sciences in professional practice". The response of the medical profession was immediate. Donald Young, the General Director of the Russell Sage Foundation, writes that: "Medical leaders concerned about social and psychological aspects of health were unexpectedly eager for increased collaboration with social scientists." This statement appears in a foreword to a book by Leo W. Simmons and Harold G. Wolff.¹ The former is Professor of Sociology at Yale University and the latter Professor of Medicine (Neurology) at Cornell University Medical College; they are, it is clear, well qualified to discuss their subject. In commanding this book to the attention of all

thoughtful medical practitioners we would point out that it is well documented and that it contains a long and valuable bibliography.

Simmons and Wolff take it for granted that for optimum medical success it is essential to reduce biological phenomena to scientific formulation, and hold that the same principle should apply to personal and social phenomena. In the past the approach to the psycho-social and the biophysical bases has been haphazard and this is no longer adequate. The challenge, they believe, to medical men is for scientific and systematic development, so that the relevant principles and skills may be utilized as far as possible in both fields of forces. The medical practitioner may study first hand in the same organs the combined effects of biophysical and psycho-social forces in operation. In short he is in a position to look both ways "and to achieve a more integrated and comprehensive perspective". In chemistry, physics and biology, as new problems arose it was necessary to cross interdisciplinary boundaries and to seek scientific allies. As a result biochemistry, biophysics and physical chemistry have emerged as new fields of specialization. In this process the identity of the parent sciences has not been blurred. The same process, we read, is becoming apparent with respect to medicine and social science. There are problems in medicine that transcend traditional, organized medical knowledge. Experts are thus being led to explore sociological factors in health and disease. This calls for alliance and collaboration, and it is not essential that either medicine or the social sciences should abandon their primary concern or concepts. Rather must each discipline achieve new orientations and perspectives in promoting joint undertakings. We need not follow Simmons and Wolff in what they write about developments in medical science—the "laboratory" period, the renewed interest in "the whole person" and the relationship between stress and disease. In dealing with developments in the social sciences, they refer to the acceptance of a "more objective perspective" which was largely the result of the opening up of vast new areas of the world in which human beings were found to be living with beliefs and customs so far different from those of the dominant civilizations that established convictions regarding the nature of man had to be thrown into the discard. Thus to explain man's ways of acting, feeling and believing it was necessary to postulate the existence of a further element, interposed between man and his environment, which helps to shape all his adaptations to his physical *milieu* and to his fellows. "This elusive and all-important element in human life, of which thinkers in earlier times were only dimly aware, has come in modern social science to be known as culture." If we accept this broad definition of culture, about which many authorities are quoted in a footnote, we may pass to Simmons and Wolff's discussion on society, culture and the individual.

The individual may, we are told, be viewed as adapting himself to life situations on three levels of integration between himself and his environment. He reacts as an organism in his physical surroundings, as a group member or agent in his society and as a person or personality in his culture. Society and culture are shown not to be the same, though the words are often used interchangeably.

¹ "Social Science in Medicine", by Leo W. Simmons and Harold G. Wolff; 1954. New York: Russell Sage Foundation. 9¹" x 6", pp. 254. Price: \$2.50.

They are perceived separately, because this "helps us perceive and formulate the dynamics of the individual's behavior, and also to predict or control that behavior within limits". It is with the same idea that man's environment is divided into physical, societal and cultural spheres. Society is concrete and its phenomena are easier to identify than are those of culture. "Culture sets the stage, ascribes the parts, and defines the terms whereby society's drama is enacted." Society is an organization of member agents. A society always arises out of groups, but it is something more than a mere aggregation; its outstanding characteristic is a system. A commonly recognized characteristic of culture is change—"a capacity to shift, accumulate or lose components". Man's image of himself, his life goals, and his successes or failure in them are defined and assessed under the dictates of his culture. Man appears then as pre-eminently a socialized and acculturated creature with a destiny bound up within these dimensions of his life—although he is free-born, he is "culture-bound". Thus "when such a person goes for medical help and strips physically, socially, and culturally before his physician or the attending staff, he may reveal tissue evidence to the watchful eye and vocal testimony to the sensitive ear of background elements in his life from all three dimensions, which working together have produced or complicated his illness".

Only the more prominent features of this book have been mentioned; sufficient has been set out, however, to allow readers to judge of its scope. Simmons and Wolff have shown us that investigation of a patient's illness is not always a simple business, but that much beyond the mere clinical findings has to be covered in almost every instance. If this is remembered and acted upon, findings will be complete and the resulting treatment adequate. On the social and cultural sides no generalizations should be made, any more than in the clinical field. The patient will always present an individual problem; it will often be complicated and difficult. That the medical practitioner must preserve a wide outlook to include social science is obvious, and finally both medical practitioners and social scientists must never lose sight of their objective, which is the welfare of the community, and of the obligation of each to include in their purview the findings of the other.

Current Comment.

THE TOLL OF THE ROAD.

It has been said that if Australian railways were to kill as many people in one year as Australian roads kill in one week-end there would be an outcry and an impassioned demand for immediate improvement of railway organization. H. G. Wells in his book "Anticipations" (1902) poked fun at the conservatism which retained the gauge of the stage coach in that of the railway and which built the first railway compartments so that each resembled the coach in appearance. Even in his day, he stated, the ghost of a horse still trotted in front of the train, though this ran on rails. What Wells failed to realize was that running on rails is after all only a part of the general plan. Even more important is the detailed organization to prevent accidents, the signalling

system, the perpetual vigilance exerted to detect the least crack in metal or fault in lubrication, and the training of engine drivers with a high standard of examination which they must pass before being qualified to take charge of a locomotive. Whilst Australian railways have a good name the world over for the infrequency of accidents, the toll of the road in relation to population is lamentably high. It is true that physical conditions favour rail transport here in comparison with other countries; fogs are rare and never of the "pea soup" variety, gradients are easier, and there are no snow storms or avalanches; after making every allowance for such favouring factors we must concede that the railways of the Commonwealth are well conducted, the rolling stock is of high quality and so is the general organization. The question arises, can automobile transport borrow something from the railways in order to lighten the heavy toll of accidents? To some degree this is possible; the tests to be passed before a driver's licence is issued can be raised a little, but we never can hope that there can be a qualifying examination so rigid as that for engine driving. Few people nowadays can afford or want to employ a chauffeur, so that we must face the fact that the traveller is also the driver. There could easily be a better system of submitting motor-cars to a systematic check over; improvements in "lanes" in roads for direction and speed can be envisaged for the near future.

Much study is now being given in America to the causes of automobile accidents and truly the figures presented are alarmingly large. At a symposium on trauma in 1954 Colonel Don Wenger, of the Air Force Medical Corps, stated that 40,000 Americans were killed on the road in 1953. "One out of every six . . . will be the victim of a serious automobile accident. An American is injured every 24 seconds and one killed every 14 minutes in a traffic accident." Dr. Horace Campbell, of Denver, at the same symposium pointed out that motor-cars are not designed for rapid deceleration, and stated his belief that this defect has been responsible for the greatest number of injuries in the last 50 years. Campbell recommended retractable seat belts and making the tops of cars as strong as the frame, and doors which would not easily open on minor impacts. Colonel Wenger also suggested a restraining harness and rearward sitting. The Indiana police are strongly of the opinion that the forceful ejection of an occupant through a door opening at even a low speed is one of the most important considerations. They believe that the medical profession can help the engineer by explaining amongst other things the effects of deceleration when met by large surfaces of the body or by small. This last-mentioned physical consideration is really of superior significance. Stevenson found that his donkey responded to the prick of a pin far more energetically than to a thump from a cudgel, though the energy expended in the prick was a small fraction of that liberated in the blow. A deceleration impact sustained by a portion of the head can obviously do more damage than if a large surface of the trunk is involved.

At the present time the training of an air pilot is lengthy and exacting and the testing of every part of the plane is now a routine, well thought out and efficiently performed; but who knows that in the near future the helicopter will not displace the motor-car and be driven by an amateur and be examined by an amateur when he remembers to do so? If this happens then there will assuredly be a crop of accidents resembling the toll of the road today. If workable methods are devised to reduce road accidents some of the principles evolved can subsequently be applied to individual air travel. That medical science can help is asserted by Americans who have studied the dangers of ever-quickening transport. Doctor and engineer have already collaborated to a high degree in public health. The engineer gave us an abundant supply of pure water and an effectual disposal of sewage, but both these contributions to modern civilization arose from medical warnings. Here it may be stated that the large amounts of water available to the inhabitants of ancient Rome were conditioned by the vogue of the bath and not by the potable quality of the water or its employment in flushing non-existing water closets. The engineer by inventing freezing and chilling appliances on a big scale

and by hygienically canning foodstuffs at the season of abundance can spread a high intake of calories, maintenance foods and vitamins over the whole year; but it should be remembered that had there been no bacteriology or clinical and pathological study of infectious diseases, there would today be no hygienic canning or bottling with human contact reduced to a minimum, if not to zero. Let the engineer study problems and invent instruments which come within the engineering sphere, but always the possibility that our health may be involved should be kept in view. When Blériot flew the English Channel in 1909 he wisely remarked that the only limit to air travel would be imposed by the human body. Humanity desires quicker and quicker transport and this urge cannot be suppressed. Collaboration between doctor, physiologist and engineer is necessary to meet the dangers which will assuredly arise.

THE OPERATIVE TREATMENT OF THE PERFORATED SIMPLE GASTRO-DUODENAL ULCER.

APART from the conservative non-operative treatment of perforated peptic ulcer, hailed as the perfect method by some surgeons and dismissed with equal scorn by others, the modern surgical treatment of choice in some clinics is to use one of two methods as a routine, namely: (a) simple suture of the ulcer with or without omental reinforcement, or (b) primary gastric resection. G. Ceulemans,¹ of Belgium, has treated one hundred patients suffering from perforation of a gastric ulcer by simple suture and omental reinforcement with no deaths. Unfortunately he does not discuss post-operative disability, but that it is nowadays slight, in early cases at least, is seen from a recent similar though smaller series reported by T. F. Rose in 1954 from the Royal North Shore Hospital of Sydney.² W. Quast, writing from the University Clinic of Groningen in the Netherlands, states that he treated a series of 153 patients with a perforated gastro-duodenal ulcer by immediate or primary resection with five deaths (a mortality rate of 3.2%), including an uninterrupted series of 134 without a death.³ It is interesting to note that Quast receives his patients almost without exception within six hours of perforation, a most enviable state of affairs. Again no mention is made of post-operative disability, nor are any long-term follow-up details vouchsafed.

From these series and others in the literature it would thus seem, strangely enough, that nowadays in a well-equipped clinic, as far as mortality or even long post-operative disability is concerned, in a comparable series of cases operated on early after perforation, there is little difference between that following simple suture and that following primary resection. If the short-term results are similar, what of the long-term results? Unfortunately, as far as resection series are concerned, there are as yet no long-term follow-up figures available. However, in regard to simple suture, we do know that it does not cure a ruptured peptic ulcer (contrary to previous beliefs). The perforation is but an unfortunate incident in the ulcer's life history, and after ten years 50% of patients require reoperation (usually partial gastrectomy) and another 20% have symptoms controlled by medical means. However, 30% of the patients (many of whose ruptured ulcers were labelled at operation as being "chronic") have never had further symptoms. These figures are actually cited by Quast as an argument for the use of primary gastrectomy in the treatment of perforated peptic ulcer. However, since it is well known that partial gastrectomy, even performed as an elective operation, may be followed by very undesirable sequelae,⁴ especially disconcerting to a patient who has had few or no symptoms prior to an acute perforation, here it must be remembered, as A. Lowdon points out, that such a patient, suffering from the pain of a ruptured ulcer, is in no position to discuss the pros and

cons of a gastrectomy with the surgeon and may later regret the surgeon's choice. These figures can therefore be used just as effectively as an argument against primary resection for a perforated ulcer. That is to say, even after ten years there are still at least 30% of patients with no symptoms after simple suture and they are still in possession of their stomachs, a much more physiological state of affairs than exists after resection, called, surely somewhat humorously, a "physiological gastrectomy".

Absolute, as apart from routine, indications for immediate resection are said to occur. They are as follows. The first is the suspicion that the ulcer is malignant. However, many a chronic benign ulcer when perforated looks neoplastic because of the surrounding edema. The second "absolute indication" is simultaneous hemorrhage from the ulcer. Again many ulcers which perforate and bleed simultaneously are adequately treated by simple suture. The third is a large chronic ulcer whose edges are difficult to approximate by simple suture because of the friability of surrounding tissues. Even here, reinforcement of an omental graft overcomes this difficulty with great efficiency. Consequently we may see that whatever operation is used in the great surgical clinics, the immediate results are comparable, both being excellent. However, if long-term results are considered, arguing from the ten-year results of those patients who have had a simple suture of their perforated ulcer, it may be seen that one in three (or even one in two) patients treated by primary resection will have had an unnecessary gastrectomy.

From these observations, then, what advice must we give to those practitioners working in isolated areas with less adequate facilities and fewer opportunities for perfecting their skill in gastric operations, when they are faced with a patient with a perforated peptic ulcer? The obvious answer is to perform a simple suture with omental (pedicle) graft. The patient should then be followed up and adequate treatment instituted when required, for the patient will be now both physically and mentally prepared for it.

CEREBRAL MALARIA.

WHEN the trophozoites of *Plasmodium falciparum* are partly grown, the parasitized erythrocytes disappear from the peripheral circulation, and it is customary to account for this phenomenon by stating that the parasitized cells become "sticky" and adhere to the walls of the smaller arterioles or capillaries. The theories advanced by E. H. Bloch¹ in his article entitled "In Vivo Microscopic Observations on the Circulating Blood in Acute Myocardial Infarction", and more especially the observations of M. H. Knisely, W. K. Stratman-Thomas, T. S. Eliot and E. H. Bloch² made ten years previously and outlined in their article on knowlesi malaria in monkeys, have a considerable bearing on this matter. These workers have developed a technique for observing, microscopically, the flow of blood in the vessels of the omentum and of the bulbar conjunctiva. They have established that the blood arriving at the conjunctival arterioles is a statistically authentic sample of the blood in the whole circulation, and hence that observations made on it are valid for the whole of the circulating blood. They have demonstrated that there exists a secondary mechanism, analogous to clotting, which they call erythrocyte microaggregation; even the slightest trauma to a blood vessel releases some substance analogous to thromboplastin which causes a film-like precipitation to collect around and to bind together small clumps (as distinct from rouleaux) of erythrocytes; blood flowing through an area of trauma emerges as a "sludge" of these aggregations which can be studied in the vessels of the conjunctiva. They have also demonstrated that in various diseases similar aggregations appear and can be seen in the conjunctiva, and they postulate that their

¹ *Acta gastro-enterol. belg.*, Volume 17, 1954, page 254.

² *M. J. AUSTRALIA*, February 13, 1954.

³ *Surg., Gynec. & Obst.*, March, 1955.

⁴ Editorial, *Lancet*, 1950, Volume II, page 273.

⁵ *Lancet*, 1952, Volume I, page 1270.

¹ *Am. J. M. Sc.*, March, 1955.

² *J. Nat. Malaria Soc.*, December, 1945.

development is related to the degree of toxicity of the infecting organisms. Thus, in a common cold or atypical pneumonia, the aggregations are small and soft, while in pneumococcal pneumonia or malaria the aggregations are large and rigid. Specifically, in the omentum of *Macacus rhesus* infected with *Plasmodium knowlesi*, Knisely and his associates observed that immediately an erythrocyte was parasitized it became coated with a thin layer of sticky precipitate which did not adhere to unparasitized erythrocytes or to the intima of vessels, but did adhere to the coating of other parasitized cells, so that ultimately there were many microaggregations of parasitized cells circulating. Later, when the parasite rate had risen to between 10% and 30% of the total erythrocytes, there came a stage at which the precipitate formed on all the unparasitized erythrocytes in the animal's circulation; this process was as if it were autocatalytic, and once initiated, it went on to completion in from ten to twenty minutes. Finally, the erythrocytes were bound in large, firm clumps which gradually became impacted in the capillary beds and small efferent venules, causing local anoxia and finally massive leakage. Bloch states that one of the major causes of the death of the monkeys from knowlesi malaria is the result of the blockages caused by these aggregations. It was also observed that when mepacrine or quinine was administered, the first effect was the breaking up of those aggregations still circulating and capable of being reached by the drug. Since the precipitate binding the aggregations looked and behaved like fibrin, the effect of heparin was investigated; it was found that when it was given early in the progress of these processes, the large and rigid aggregations did not form and the fluidity of the blood was kept within normal limits, though the heparin had no power to cause breaking up of clumps which had already formed.

No such observations have been made on human beings infected with malaria, but it occurs to us that here can be found ideas of promise for the treatment of cerebral malaria. In the first place, it is obvious that the mechanism of the disappearance of partly grown *P. falciparum* parasites from the peripheral circulation must be the same as that for *P. knowlesi*—the parasitized cells become "sticky", but instead of themselves adhering to the walls of the capillaries, they form clumps which become impacted. This is in full conformity with the observed facts. (Incidentally, since *P. vivax* and *P. malariae* do not disappear from the peripheral circulation at any stage and do not give rise to symptoms indicating impaction of clumps of cells, it can be assumed that the formation of a sticky coating is very much less in these infections than in a falciparum infection—similar variations have been observed in two types of pneumonia, for instance.) Clinical manifestations depend on the area where sufficient significant impaction of clumps occurs. If the area is in the brain, one of the forms of cerebral malaria will result; if it is in the splanchnic area, there will be the vomiting and diarrhoea of so-called "gastric fever". At other sites, the clinical manifestations are not so well defined or so urgent. The impacted parasitized cells cause their damage by interfering with the flow of blood through the vessel, by preventing access to the intima of whatever blood is available, and by withdrawing oxygen and nutrient from the adjacent vessel wall, so that the wall weakens and bursts. It is not until a considerable degree of impaction has occurred that signs of cerebral malaria can be observed. By analogy with knowlesi malaria in monkeys, if at this stage a suitable antimalarial drug is injected, and if the circulation past the impacted aggregations of parasitized erythrocytes is not completely closed off, the drug can reach the aggregations, destroy the fibrin-like coating, and thus permit of the circulation's being reestablished. Clinically, whether the onset has been marked by localized intense, boring headache (indicating probably the impaction of a single large clump), by convulsions in a child, or in an adult by irritability, drowsiness and progressive coma (indicating probably the simultaneous blocking of numbers of vessels), by a sudden stroke-like collapse (due to bursting of a blocked vessel in a vital area), by vomiting (central, due to anoxia of the centre) or with diarrhoea (due to splan-

chic anoxia), there follows a stage of one or more hours' duration wherein the only feature is coma in the cerebral form or pitiless, unremitting vomiting and diarrhoea in the gastric form. The next feature, except for occasional convulsions in children, is usually a noticeable failure of the circulation; there is cyanosis, the pulse becomes sluggish and the breathing distressed. When there has been massive dehydration through vomiting and diarrhoea this stage appears earlier, but does not usually achieve the extreme severity of the cerebral form, for the vascularization of the splanchnic area is much more free than that of the brain. In cerebral malaria, the extreme sluggishness of the circulation, in the absence of extensive fluid loss, might very well be explained by micro-aggregation of the unparasitized cells and "sludging" of the blood in the same way as this occurs in monkeys with knowlesi malaria. In any case, in the course of cerebral malaria three stages of circulatory embarrassment can be recognized: early, the circulation is vigorous enough for an intramuscular injection to be absorbed rapidly; later, the circulation is obviously so sluggish that to give an intramuscular injection would be useless, and the intravenous route must be used; and terminally, even an intravenous injection would be unlikely to travel far enough and fast enough to do much good. Cerebral malaria is a desperate condition, especially in children. Only too often, even when the diagnosis is made and the treatment started early, the patient's condition progressively deteriorates. Knisely and his colleagues have shown that if heparin is given early in the progress of knowlesi malaria in monkeys, the formation of erythrocyte aggregations is forestalled. Since the progress of cerebral malaria so closely parallels that of knowlesi malaria, the question arises whether the administration of heparin as early as possible in the course of cerebral malaria might not forestall some "sludging" of the blood and secure a little more time and keep the circulation a little more effective, providing that little wider distribution of drugs which might make the difference between failure and success.

DETERGENT SPRAYS FOR LIQUEFYING VISCID SPUTUM.

THE word "detergent" merely means a cleansing agent—water, for instance, is an excellent detergent. Certain modern types of detergent, the sulphonated higher fatty acids, have a remarkable capacity for lowering the surface tension of water and extending its wetting power to substances which it would otherwise be unable to attack. Several overseas writers have reported using this property to liquefy viscid sputum and to simplify drainage in various respiratory disorders. Nearer home, J. Borrie and N. C. Begg,¹ in a paper entitled "Humidification in Respiratory Disorders with Aerosol Detergent", have just given a description of a case in which one of the modern detergents, sodium lauryl sulphate, was successfully used in this way. A baby, suffering from the after-effects of the impaction of a foreign body in the larynx, developed asphyxia from bilateral occlusion of the bronchi by plugs of inspissated mucus, which were not broken up by instilled streptokinase-streptodornase. Altogether eighteen emergency bronchoscopies were performed, and the baby's condition was desperate. Then a 5% aqueous solution of sodium lauryl sulphate was blown through a nebulizer with oxygen, in a tent; the actual technique was to place the solution in a transfusion bottle and to drip it at the rate of eight drops per minute into the nebulizer, with the oxygen flowing at eight litres per minute. This afforded prompt relief—the viscosity of the mucus soon became less, and the baby recovered rapidly. This is merely another instance of how agents developed for industrial use are continually being adapted for use in medicine. Truly, science knows no borders. At the risk of being called pedantic, however, we would point out that the use of the word "aerosol" in the title of Borrie and Begg's article may be misleading. As described in the text, the

¹ New Zealand M. J., April, 1955.

actual mechanism was that of nebulization—the usual aerosol technique is to dissolve the substance in a highly volatile liquid (freon usually, though liquid carbon dioxide is often used), and then release it through a small opening, so that a cloud of minutely divided particles or droplets is produced. Obviously this method could not be used in circumstances such as are described by these writers.

CANCER CELLS IN URINARY SEDIMENT.

It is one hundred and twelve years since Walthe observed fragments of lung cancer in sputum, and eighty-five years since Beale demonstrated actual neoplastic cells in sputum from a patient with pharyngeal cancer. Since then, many workers have touched on the possibility of diagnosing cancer by studying the cytology of various secretions, but it was not until 1941 that Papanicolaou and Traut reported that uterine cancer could be diagnosed with certainty by identifying tumour cells in the vaginal secretion, and until 1947 that Papanicolaou demonstrated cancer cells in urine. In this journal, on October 16, 1954, appeared a general review of the value of exfoliative cytological studies in the detection of cancer, by C. Duncan; in this article Duncan pointed out that the urinary tract was the weakest field of cytological application. Recently, however, Carl Deden, of Copenhagen,¹ in a monograph entitled "Cancer Cells in Urinary Sediment", has discussed his technique for making examinations, and his results in a series of 302 cases. His results indicate that his methods are sound, and it can be said that urinary cytology has now caught up with the other fields.

Deden uses urine passed by men, but he catheterizes women; he prefers diurnal to early morning urine, mainly because decomposition has often occurred before the early morning specimen is passed, and sometimes because, in debilitated patients lying still in bed, sedimentation occurs in the bladder, and the specimen obtained before they have been moved about at all contains few cells. He uses a much larger quantity of urine—200 to 400 cubic centimetres as contrasted with the 5 to 40 cubic centimetres used by other workers—so that a large amount of cellular sediment is made available for examination. As soon as the specimen is collected, one-quarter of its volume of 80% to 90% alcohol is mixed with it, as a preservative, and the mixture is poured into a separating funnel. In about six hours, sedimentation is complete; then the sediment is drawn off and centrifuged for ten minutes at 2000 revolutions per minute. When the amount of sediment is very large, as occurs when there is much haematuria, the erythrocyte layer will be at the bottom of the separating funnel, and can be drawn off and discarded first. After centrifugation, the supernatant urine is pipetted off, any mucus sucked up with filter paper, and the cellular layer spread on slides previously coated with egg albumen-glycerin to ensure its sticking; two to four slides are made up, a fine flat brush being used as a spreader. As soon as the preparation starts to dry at the edges, the slides are fixed in a mixture of equal parts of absolute alcohol and ether. Then they are stained for four minutes in Harris's haematoxylin, rinsed for twenty minutes in tap water, stained for four minutes in 0.05% aqueous eosin solution, rinsed in tap water, taken through alcohols to xylol, and covered.

Deden's criteria for assessing the likelihood of malignancy in the cells are: (i) Nucleus relatively large in relation to the amount of cytoplasm. (ii) Nucleus hyperchromatic, with a coarse chromatin network. (iii) Nucleoli large, multiple, of heterogeneous sizes. (iv) Abnormal mitotic figures. (v) Nuclear membranes irregular, with nodular, coarse contours. (vi) Relatively scanty cytoplasm, often ill-defined, and sometimes vacuolated. Deden expands Papanicolaou's grouping of observations as follows: Class I, absence of abnormal or atypical cells; no tumour cells. Class II, atypical cells present, but without abnormal features: probably no tumour cells. Class III, cells with abnormal features, but not sufficiently

pathognomonic: possibly tumour cells. Class IV, fair number of pathognomonic cells and cell clusters: probably tumour cells. Class V, large numbers of conclusive cells and cell clusters: tumour cells. When infection is present in the genito-urinary tract, the inflammatory cells and erythrocytes obscure the picture; treatment with antibiotics, while it reduces these, also causes a large reduction in the number of tumour cells—probably because the infectious process is largely responsible for the exfoliation of the tumour cells. Non-malignant degenerative changes in epithelium result in the shedding of abnormal epithelial cells, and histiocytic cells occur in inflammatory conditions; both of these may cause errors in diagnosis.

Of Deden's patients, 98 had cancer in the urinary tract, and in 59 of these cases, definite tumour cells were reported, while in 20 the report was "probably tumour cells"—a diagnostic efficiency of 80%; of the others, five were reported as having, possibly, tumour cells, seven as "probably not", and seven as none—that is, 5% indeterminate observations and 14% false negatives. Of 193 patients in whom, as far as could be proved, no cancer existed, only one was reported as having definite tumour cells and three were reported as having, probably, tumour cells, which represents 2% of false positives; 10% of results were indeterminate; there was thus a diagnostic efficiency of 88%. These figures show that correct estimates were achieved in 85.5% of cases, incorrect ones in 6.1%, and indeterminate in 8.3%. Obviously, there is much valuable information to be gained from this form of investigation. The technique is simple, and the patient is involved in no procedure of any physical or mental significance whatever. Perhaps, since the method does not indicate where in the urinary tract the tumour cells originate (though Deden, after much experience, seems to have made some excellent estimates), all that can be gained is, in the case of a positive result, an indication to continue investigation of the urinary tract, while a negative result would suggest a search elsewhere; but this could on occasion prove to be really useful and time-saving. Obviously, too, a great deal of practice and experience is necessary to acquire the discriminating skill needed to recognize tumour cells and to give reports of the standard of accuracy achieved by Deden.

A CLASSIFICATION OF LEPROSY.

THE Indian Association of Leprologists, at its second biennial meeting, adopted a revised classification of leprosy for use throughout India. There is nothing new in the actual classification, though the symbols adopted for rapid recording of clinical states are new. The system appears to be a practical one. The broad classification for general purposes is into lepromatous (L) and non-lepromatous (N) types, with the symbol N?L for doubtful or intermediate types. For more detailed classification the non-lepromatous (N) types can be split into three classes based on the clinical differences in the skin lesions and neural manifestations: red, thick, anaesthetic, tuberculoid patches (T), maculo-anaesthetic lesions (MA) and polyneuritic sensory or motor changes due to nerve trunk involvement, without skin lesions, (P). Further, in the N?L type, the skin lesions can be divided into the indeterminate group (I), lying between the maculo-anaesthetic and flat lepromatous patches, and the borderline (B) showing features somewhere between the tuberculoid and the thick lepromatous patches. The circular issued by the Association under the date of March 29, 1955, does not make the status of the mixed group N?L any clearer than it ever was—presumably it is still the clinical junk-heap on which are thrown those early-cases which have not yet settled down into one or other of the major groups, together with any cases at the stage where, adequate defences having been developed, the lepromatous type is changing over to the non-lepromatous. At first glance, it seems as if some more precise designations than "indeterminate" and "borderline" would be desirable, but on consideration of the impossibility of precision in this group, it becomes obvious that these descriptions are well chosen—they certainly have a shade more meaning than the old term "mixed".

¹ *Acta radiologica*, Supplementum 115, Stockholm, 1954.

Abstracts from Medical Literature.

GYNÄCOLOGY AND OBSTETRICS.

Carcinoma of the Fallopian Tube.

S. L. ISRAEL, W. E. CRISP AND D. C. ADRIAN (*Am. J. Obst. & Gynec.*, December, 1954) report two cases of primary carcinoma of the Fallopian tube in which the pre-operative diagnosis was made on the basis of inexplicable post-menopausal metrorrhagia. They state that reports indicate that this disease is most common in the fifth decade. In 499 previously reported cases less than half the patients had symptoms which in post-operative retrospect could have led to pre-operative diagnosis. No more than 5% of cases were recognized before operation. The most common symptom is bloody or sero-sanguineous vaginal discharge. *Hydrops tubae profluens* is rarely observed. Colicky abdominal pain, localized to one lower quadrant with occasional radiation to the lumbar area, is the next most common symptom. Primary carcinoma of the Fallopian tube provides one of the few instances in which pain is significant in the early diagnosis of cancer—probably resulting from the rapid distension of the tubal wall by the tumour. The only physical sign is a palpable adnexal mass, the ease of palpation of which is of ominous portent in regard to the extent of involvement. Vaginal smears should be studied in all suspected cases. The accepted treatment is radical surgery, and in general the prognosis is poor; the reported five-year survival rate varies from 5% to 40%.

Treatment of Cervical Carcinoma with Radioactive Gold.

W. M. ALLEN, A. E. SHERMAN AND A. N. ARNESON (*Am. J. Obst. & Gynec.*, December, 1954) have studied the effects of irradiation of the parametrium with radioactive colloidal gold, having in mind the facts that few patients suffering from carcinoma of the cervix are saved by operation when the lymph nodes are involved, and that recurrences in irradiated patients are frequently found in the lateral parametrium. Radioactive colloidal gold has a short half-life of two to eight days, with 90% of the activity in the form of β particles and 10% in γ rays. These properties make interstitial injection feasible, and the majority of the effects will be in the immediate vicinity of the gold particles, which are so small that they should enter the lymphatics and be filtered out by the reticulo-endothelial system of the lymph nodes. Experiments showed that when 30 to 40 millilitres of solution were injected on each side, the pelvic lymph nodes were irradiated much more than is usually achieved with X rays and radium, and the radioactivity remained unchanged in the area of injection except for decreasing intensity due to the natural decay of the radiogold over a period of two weeks. When this is combined with radium applications as well, the entire pelvic region receives a fairly effective dose of radiation without over-irradiation

of the cervix, bladder and rectum. In the series of cases presented, the two to four and one-half year survival rate of patients with Stage I lesions was 91.4% in the series treated by radiogold, 78.1% in those treated with X rays and radium (private patients) and 72% in the clinic patients treated with X rays and radium. Eight out of nine patients with Stage 2 lesions treated two years or more ago are alive and well. The one-half to four and one-half year survival rate for patients with Stage 2 lesions was 89.3% in the radiogold group, 56.5% in the private patients treated with X rays and radium, and 48.1% in the clinic patients.

Pelvic Lymph Node Excision in Cancer of the Corpus Uteri.

A. BRUNSCHWIG AND A. I. MURPHY (*Am. J. Obst. & Gynec.*, December, 1954) review 70 cases of cancer of the *corpus uteri* in which pelvic lymph node excision was performed. Of 57 cases in which radical hysterectomy and pelvic node excision were carried out, metastases were present in the nodes in 10. Of 17 other cases in which the nodes were excised as part of an exenteration operation for late spread of corpus carcinoma, metastases were present in four. The authors conclude that endometrial carcinoma may spread in similar fashion to epidermoid carcinoma of the cervix—that is, invasion of parametrium, bladder and rectum and metastasis to pelvic lymph nodes before spread to extrapelvic sites occurs. Local direct spread to bladder and pelvic colon may occur prior to metastasis to pelvic nodes. Consideration of the pelvic lymph nodes in the surgical treatment of endometrial cancer indicates need for a radical panhysterectomy with lymph node excision.

The Menopause.

E. R. NOVAK (*J.A.M.A.*, October 9, 1954) states that the menopause is a physiological necessity rather than a disease. However, various misconceptions and superstitions have combined to cause a fanciful rather than factual attitude on the part of both patient and physician. Various physiological and physical changes must be recognized, but other psychosomatic manifestations are often misinterpreted merely because they occur in a woman in her forties. As long as normal menses are occurring one cannot attribute symptoms to the menopause; indeed, the only valid criteria for treating the menopause are the vasomotor flushes, sweats and flashes. Hormone therapy should be used only as a last resort, should always be oral and should be in the smallest doses over the shortest period of time adequate to control symptoms. Estrogens are preferred, but other types of hormones can be used. It must always be remembered that careful investigation of any bleeding is mandatory.

Growth Characteristics in Tissue Culture of the Uterine Cervix.

J. G. MOORE (*West. J. Surg.*, January, 1955) reports a study of growth characteristics in tissue culture of the uterine cervix. The widespread employment of

vaginal smear cytology has led to the detection of increasing numbers of early and controversial lesions of the cervix ranging from the so-called premalignant lesion, through *carcinoma in situ* to early invasive epidermoid cancer. The author had reported in a previous study that normal squamous cervical epithelium was difficult to grow, whereas malignant epidermoid epithelium grew extensively. Tissue obtained by cervical biopsy was divided into two portions, one for histological examination of sections, and the other for tissue culture studies. The latter portion was minutely subdivided and explanted under aseptic conditions into a thin film of clotted plasma. During the two-year period of this report, cultures were prepared of cervical tissue from 27 patients with carcinoma of the cervix, from eight non-pregnant patients with normal cervix, from eight pregnant patients with normal cervix, and from eight patients with questionably malignant lesions of the cervix. During the period covered by this report (1952 to 1954) 12 patients with intraepithelial or minimally invasive carcinoma of the cervix were detected. Of the tissue cultures from the 27 patients with carcinoma of the cervix, a good growth response was noted in 23. Tissue from only four of the eight normal cervixes showed even a restricted or minimal ability to grow in culture. Of the eight pregnant patients, tissue from only one showed moderate growth. Tissue cultures from controversial lesions such as *carcinoma in situ* or minimally invasive carcinoma grew with the same facility as tissue from frankly invasive carcinoma of the cervix. Although growth response was extensive in *carcinoma in situ*, a relative uniformity of cell type and cell arrangement was found. The author indicates the criteria necessary for the establishment of the diagnosis of *carcinoma in situ* and sets out the obvious drawbacks in tissue culture studies. He states that clinical conclusions cannot be drawn from tissue cultures, but that valuable supplementary evidence may be obtained in doubtful and controversial lesions. As a cervical lesion may be intraepithelial at one point and invasive at another, the author considers that single or multiple punch biopsies are of limited value in the diagnosis of *carcinoma in situ*. A plea is made for the study of a cervical cone in all cases of doubtful cancer of the cervix.

Vaginal Hysterectomy.

A. L. BANKS AND R. N. RUTHERFORD (*West. J. Surg.*, January, 1955) report an assessment of 120 operations of vaginal hysterectomy; 102 of the patients had some type of vaginal plastic repair for prolapse. The authors emphasize the importance of variation in operative technique to suit the individual patient. The advantages and contraindications of this operation are stated and the operation is described and illustrated in detail. A routine evaluation of the pelvic floor and supports is made on all patients regardless of the operative approach. Particular care is given to pre-operative preparation. Mental *rapport* as well as physical vigour is desirable before operation. All patients undergo a routine vaginal smear examination before operation, and cervical erosions

and leucorrhœa are treated. Hormone creams or suppositories are used pre-operatively for patients with atrophic vaginal mucosa. In discussing operative technique the authors stress the importance of placing the cardinal ligaments to the pubo-cervical fascia of the other side as high as is necessary to shorten its attenuation. An indwelling catheter is inserted at the completion of the operation, and ambulation is insisted upon on the second day after operation. The mortality rate was nil in this series, and the only significant post-operative complication was vaginal bleeding, which occurred in three cases two weeks after operation. The average stay in hospital was seven to ten days, and most patients were fit to resume their normal activities after eight weeks. No patient in the series needed subsequent operation, as there was no recurrence of vaginal prolapse. The authors attribute the uniformly good results to a careful selection of patients, individual variation in surgical technique and attention to pre-operative and post-operative treatment.

The Parametrium in Carcinoma of the Cervix.

ICHIRO NAKAMURA (*J. Japanese Obst. & Gynec. Soc.*, January, 1954) reports a histological study of the parametrial tissues from 100 specimens removed by radical panhysterectomy for carcinoma of the cervix. An attempt is made to correlate the clinical assessment of parametrial infiltration with the actual histological findings. It is well known that infiltration of nearby connective tissues of a cervical cancer is not always neoplastic. The 100 cases under review had been clinically classified as follows: stage I growth, 27 cases; stage II growth, 72 cases; stage III growth, 1 case. Sections were examined from the primary lesion, and from three regions of the parametrial connective tissues on each side—from the site near the cervix, from the middle site and from the distant site. The author has considered each side of the parametrium as an independent case, and in the 200 lateral samples he assessed palpable infiltration as follows: no infiltration, 69; slight infiltration, 60; moderate infiltration, 70; strong infiltration, 1. The histological patterns noted in examination of the parametrial tissues comprised cancerous infiltration, inflammatory infiltration and connective tissue proliferation. Among 69 specimens in which clinical infiltration was absent, cancerous infiltration of the parametrium was present in 8.7%. Of 60 specimens in which slight clinical infiltration was present, involvement of the parametrium was found in 26.7%. Of 70 specimens in which moderate clinical infiltration was present, parametrial spread was found in 48.6%. In general there was an incidence of 28.5% of carcinoma among the 200 parametrial tissues examined, and there was an incidence of 38.9% of cancer of the parametrium in 131 samples in which clinical infiltration had been found. The degree of clinical infiltration corresponded with that of cancerous infiltration in 57% of the 200 specimens. Forty of the 100 patients studied had spread of cancer to at least one side of the parametrium. The author suggests that clinical infiltration and cancerous involve-

ment of the parametrium increase more or less in parallel, but that in 8.7% of cases the parametrial tissues are infiltrated with carcinoma without the clinical signs of infiltration being present. He considers that clinical infiltration of the parametrium, palpable in cases of carcinoma of the cervix, is produced by the proliferation of connective tissues and should be regarded as chronic proliferative inflammation.

The Diagnosis of Female Genital Tuberculosis.

RYUJI YAMAGUCHI (*J. Japanese Obst. & Gynec. Soc.*, April, 1954) discusses methods employed in the diagnosis of female genital tuberculosis. Diagnostic investigations in 118 proven cases are discussed with special reference to the advantages of culture of uterine-lavaged fluid. The following diagnostic methods are briefly described and assessed: the culture of tubercle bacilli from the vaginal content, culture of tubercle bacilli from uterine-lavaged fluid, enriching culture, endometrial biopsy and hysterosalpingography. Endometrial biopsy is extensively used, but has certain obvious limitations. Culture of tubercle bacilli from vaginal discharge is most likely to be successful during the few days before and the few days after the menstrual period. It is also most valuable in cases of early disease. Even by all combined methods the author considers that the diagnosis of genital tuberculosis is not always possible, and that laparotomy may be necessary. After assessing the foregoing methods used in 300 diagnosed cases, Yamaguchi considers that the uterine-lavage method has been found technically most easy and gives a high percentage of positive results. In the 118 reported cases the percentage of positive cultures obtained was highest in uterine-lavaged fluid and lowest in that of vaginal content. The results of endometrial biopsy were slightly inferior to those obtained by culture of uterine-lavaged fluid. Positive results by the three different methods of investigating the series of 118 patients were as follows: uterine-lavage method, 70%; endometrial biopsy, 66%; vaginal content culture, 60%. The author describes three typical cases to show the advantages of uterine-lavage culture in diagnosis. He concludes that this method is superior to endometrial biopsy or vaginal-content culture by virtue of its higher percentage of positive results.

MEDICINE.

Corticotropin Gel in Nephrotic Children.

A. J. MERRILL, J. WILSON AND L. F. TIMBERLAKE (*Arch. Int. Med.*, December, 1954) have treated 25 nephrotic children with continuous corticotropin gel. After a ten-day trial course on the conventional dose, children who fail to improve are given a daily dose of one milligramme per pound until albuminuria has been absent for one to two weeks. If there is no response in three weeks the dose is increased by 20%. Once albuminuria and

oedema are controlled, the dose is gradually reduced over several months. Relapses are treated in a similar way. Electrolytes and antibiotics are given as required. Of 25 children treated, all but two are free of oedema, and all but three are free of albuminuria. While relapses have occurred, the course of 24 patients suggests that all 24 will be well eventually. Most patients return to full activity in two to six weeks. Progressive renal failure and death have not occurred during more than two years of observation.

Histoplasma and Coccidioides in So-called Tuberculoma of the Lung.

L. E. ZIMMERMAN (*Arch. Int. Med.*, November, 1954) has examined a series of 35 surgically resected discrete pulmonary granulomata presenting typical macroscopic and microscopic features of tuberculoma. Tubercle bacilli were found in six, coccidioides in three and histoplasma in 19. No organism was found in seven. The fungi occur in the central necrotic areas of the lesion, and appropriate staining techniques, which are referred to, are required.

Aortic Stenosis.

J. BERGERON, W. H. ABELMAN, H. VAZQUEZ MILON AND L. B. ELLIS (*Arch. Int. Med.*, December, 1954) review 100 cases of aortic stenosis in which autopsy was performed. The average age of the subjects at death was sixty-nine years, and in ten cases aortic stenosis did not cause or contribute to death. Thirty-two patients who survived the seventh decade denied cardiac symptoms prior to the age of seventy years. Men outnumbered women by three to one. The symptoms were the usual ones of heart failure, dyspnoea, peripheral oedema, orthopnoea, cough, weakness and cardiac pain. Cerebral symptoms were relatively uncommon. The severity of symptoms appeared to be of little aid in assessing the degree of stenosis and the coexistence of degenerative vascular disease. The classical signs of basal thrill and murmur with diminished second sound were frequently not noted, and the diastolic pressure was often low, with a wide pulse pressure. A harsh systolic murmur at the cardiac apex was frequently the only physical sign of aortic stenosis. It is concluded that aortic stenosis even when severe may be accompanied by few if any of the classical signs. Once cardiac symptoms have appeared, the prognosis is guarded. It is emphasized that the subjects were not examined during life by the authors.

Infective Hepatitis.

R. E. CAMPBELL AND F. W. PRUITT (*Am. J. M. Sc.*, January, 1955) found that the administration of 30 microgrammes of vitamin B_{12} by intramuscular injection every other day and five milligrammes of folic acid by mouth three times daily for ten days greatly shortened the course of infective hepatitis and accelerated convalescence. Conventional treatment was also given. Forty-four patients formed the experimental group, and there were 44 controls. Theoretical reasons are advanced to account for the experimental results.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held on October 28, 1954, at the Verco Theatre, Institute of Medical and Veterinary Science, Adelaide. Dr. IVAN JOSE, the President, in the chair.

Clinical Aspects of Electroencephalography.

Dr. J. V. GORDON read a paper entitled "Clinical Aspects of Electroencephalography" (see page 868).

Dr. T. A. R. DINNING, in opening the discussion, said that the neurosurgeon was fortunate in having at his disposal a wider variety of precision diagnostic techniques than perhaps existed in most other fields. For the investigation of cerebral disorders ventriculography, encephalography and cerebral angiography were available. Those radiological methods when fully developed permitted a high degree of diagnostic accuracy—in the case of cerebral tumours over 95%. The methods were dependent on gross structural alterations in the intracranial contents. Electroencephalography provided an entirely different type of tool, which gave information about altered function of the brain quite apart from alterations in structure. The type of information to be derived from electroencephalographic examination was therefore a good deal different from that given by radiological methods. On the one hand it might, and often did, give early information about a cerebral neoplasm before structural changes and the concomitant symptoms and signs were pronounced, or on the other hand it might provide valuable information of disordered function when structural changes were usually absent or minimal—as, for instance, in certain post-traumatic states or in many types of epilepsy.

However, it had to be emphasized that the electroencephalogram was merely a tool. Its value was largely dependent on adequate clinical appraisal, and more often than not, on correlation with information derived from radiological studies. Dr. Gordon had indicated its diagnostic value. In addition, however, the neurosurgeon found it of considerable value in controlling or planning treatment, and Dr. Dinning proposed to touch briefly on those aspects of encephalography. He went on to say that Dr. Gordon had described the changes which one might expect to find in brain tumours. The electroencephalogram in those cases might be of value in two ways. Firstly, it was of considerable help in selecting those cases of epilepsy of late onset which should be thoroughly investigated by radiological methods as arousing suspicion of tumour. In such cases a discharge of slow waves emanating from a focal point over one or other cerebral hemisphere was at least indicative of local brain damage, and if the focus became more evident on repeated electroencephalographic examinations it should be regarded as due to an underlying neoplasm until that was disproved by radiological methods.

Secondly, although the diagnosis of tumour might not be in doubt, electroencephalography might give sufficiently accurate localization in combination with ventriculography or arteriography to enable a biopsy to be taken through a burr hole, so that needless explorations of inoperable tumours could be avoided. Dr. Gordon used the standard electrode array in which 18 electrodes were arranged over the head and recordings could be taken from any six electrodes simultaneously. The average distance between adjacent electrodes was about 3.0 centimetres, and the distance from the scalp to the surface of the brain varied in different persons from 1.0 to 1.5 centimetres. With careful recording technique it was therefore possible to localize a lesion on or just below the surface of the brain to within 1.5 centimetres—an accuracy which was adequate for biopsy purposes through a burr hole. Tumours which were more deeply submerged below the surface would, of course, produce less well-defined localization; but frequently the localization would be sufficient to allow a craniotomy flap to be mapped out.

Dr. Dinning then said that in order to assess the value of electroencephalography in cases of that type, he had analysed the records of 21 cases of verified intracranial tumours in which pre-operative electroencephalograms were taken. In four cases the electroencephalograms were normal; two were cases of cerebellar tumour, in which the electroencephalogram was often normal; one was a case of meningioma, in which the patient interestingly enough presented with focal sensory epileptic attacks; the remaining

case was one of glioma of the *corpus callosum*. Five patients had abnormal electroencephalograms, but the abnormality was non-specific and was not helpful in localizing the lesion. Eight patients had a localized abnormality in the electroencephalogram which would have been sufficient if it had been necessary to expose the tumour by a craniotomy flap based on the electroencephalographic findings. In four cases there was a sharply defined electroencephalographic focus, and in these cases a burr hole biopsy could have been made on the electroencephalographic findings alone. Thus the electroencephalogram gave information which would materially assist in planning the operative approach in 12 of the 21 cases.

With regard to the surgical treatment of epilepsy, Dr. Dinning had not a great deal to say at the moment. He pointed out that prior to the introduction of electroencephalography as a diagnostic tool, sporadic attempts had been made by neurosurgeons to cure epilepsy by operations on the brain, and indeed the earliest of all neurosurgical operations was trepanation of the skull for epilepsy in the time of the Pharaohs. However, the results in general were discouraging, and neurosurgeons turned to more urgent and rewarding fields. Now that they understood more fully the mechanism of epilepsy and could accurately define the origin of the electrical disturbance responsible for a seizure, many of those patients would be suitable for surgical cure. The aim of the operation was to remove the epileptic focus, and when they were evident, the pathological lesions. When the area of cortex involved was extensive, this resection might permissibly be radical so as to include a bordering zone of apparently healthy tissue. In other parts of the brain the excision must necessarily be limited owing to the risks of producing paresis or other neurological deficits.

Dr. Dinning then enumerated the following indications for operation in cases of epilepsy at the present time: (i) the establishment of a focal origin of the seizure and its location; (ii) the demonstration of its accessibility for surgical removal without undue residual disability; (iii) the diagnosis of the pathological nature of the lesion (which, however, might at times be matter for conjecture); (iv) the failure of medical treatment. He said that he was sure that in a few years the bulk of the work of a neurosurgical unit would be associated with the surgical treatment of epilepsy.

Dr. Dinning then discussed head injuries and their sequelæ, which he said formed a large and important group of disorders in the practice of neurosurgery. In the acute stage of a head injury electroencephalography was largely of academic interest, although, as might be expected, gross changes occurred in the electroencephalogram. In mild cases of trauma the electroencephalogram was the most sensitive indicator of cerebral damage. In the chronic post-traumatic state which supervened after a head injury, the electroencephalogram could be of considerable value. Such patients complained of a variety of symptoms, which, however, tended to follow a fairly definite pattern. The commonest symptoms were headache, giddiness (often precipitated by changes in posture), and mental symptoms such as inability to concentrate, intolerance of noise, impaired memory and so on. There appeared to be a fairly high degree of correlation between an abnormal electroencephalogram after the initial recovery from a head injury and the exhibition of such symptoms, although the electroencephalographic changes tended to be rather non-specific. In severe cases the electroencephalographic abnormality tended to persist for several years after the injury. An abnormal electroencephalogram after recovery from an acute head injury was thus of some prognostic value in forecasting the likelihood of residual symptoms. In regard to post-traumatic epilepsy, it was now possible to lay down fairly definite prognostic criteria. Firstly, in the case of compound head injuries with penetration of the dura (in which the incidence of post-traumatic epilepsy ranged from 25% to 50%), surgical removal of the damaged brain before seizures commenced, and subsequently a normal electroencephalographic tracing from the damaged area, made the later appearance of post-traumatic epilepsy unlikely. Secondly, when larval seizure patterns occurred in an electroencephalogram after injury—in other words, discharges electrically typical of epileptic seizures without the outward manifestation of a seizure—clinical epilepsy was almost certain to supervene. Summarizing the situation with regard to head injuries, Dr. Dinning said that the electroencephalogram might afford information of prognostic value in indicating a delayed recovery with the development of the chronic post-traumatic state, and it might provide definite indications as to the likelihood or not of the development of post-traumatic epilepsy. However, he reemphasized the fact that a normal electroencephalogram did not rule out post-traumatic epilepsy.

DR. M. E. CHINNER asked whether the electroencephalogram had ever been accepted as evidence in the law courts.

DR. H. M. BIRCH said that they had been taking electroencephalograms at Parkside Mental Hospital since 1947, at first by means of a three-channel Grass machine; about three years prior to the meeting an eight-channel "Ediswan" had been used. Dr. Birch said that in one case of a charge of murder without any discoverable motive, he had given evidence to the effect that the electroencephalogram revealed no abnormality. At the time, the circumstances suggested as a very remote possibility that the crime might have been associated with some form of epileptic automatism. The evidence given then, as in other subsequent less serious charges, was not challenged. That evidence related to electroencephalograms which could be regarded as within normal limits. He understood that evidence demonstrating abnormalities in the electroencephalogram had been accepted in England. A note of warning was sounded as to what weight could be placed on any electroencephalogram, normal or otherwise. It was pointed out that quite a number of people with epilepsy had, in fact, in the interseizure periods, records that showed little if any abnormality, and certainly nothing upon which it could be stated that the patient was epileptic. Then, again, many people with well-adjusted personalities had electroencephalograms which were not within the normal range. All that, of course, came back to the question of what was and what was not abnormal in electroencephalograms, and what were the factors determining various deviations. The electroencephalograph in forensic medicine should be regarded as just another useful instrument, like the ophthalmoscope, for instance, for making a complete investigation of the patient. It could not give the answer to the question of criminal responsibility. Dr. Birch said that so far they did know that certain groups of people, who were constantly in trouble with society and the law, had mild abnormalities in their electroencephalograms about three times as commonly as the rest of the community.

DR. MARK BONNIN said that the science of electroencephalography had been pioneered in South Australia by Dr. H. M. Birch at Parkside Mental Hospital. For several years Dr. Birch had made his machine and his interpretations of results available to clinicians, and Dr. Bonnin expressed to him the gratitude of many members of the South Australian Branch of the British Medical Association for that early work. As the demand increased, it had been met by Dr. W. R. Adey, who built a machine in the Department of Anatomy at the University of Adelaide. Though primarily for experimental work, Dr. Adey made this machine available to clinicians without fee. His extensive knowledge of neuroanatomy and his experience in the interpretation of the electroencephalogram made his opinion of great value in the solution of difficult neurological problems. That work had been done in addition to routine teaching and research, so that Dr. Adey worked far into the night for weeks on end. Many patients had reason to be grateful to Dr. Adey for his energy and enthusiasm, and with his departure for the United States of America a strong link between the basic sciences and clinical medicine has been lost. However, they were fortunate in now having Dr. Gordon, who, since his return to Adelaide, had set up an electroencephalographic service.

DR. RAYMOND BINNS asked at what age the cortical rhythms matured, and also what was the youngest age at which it was possible to take an electroencephalogram.

DR. GORDON, in reply, said that as a general rule it was not until the age of fourteen or fifteen years that the electroencephalogram reached a pattern of cortical rhythms similar to that seen in the normal adult. Until that age a gradual process of maturation took place. Up to the age of one or two years the rhythms consisted largely of slow δ waves. After that age θ rhythms at four to seven cycles per second appeared conspicuous for several years, but by the age of eight years a activity was dominant, and adult maturity was usually present by the age of fifteen years. An electroencephalogram might be taken at any age. In young children or infants, when restlessness and inability to cooperate were present, sedation might be employed and a sleep record taken.

DR. ROBERT ANGOVS asked why it was that focal epilepsy arose from a cortical scar when the affected tissue was presumably atrophic and inert.

DR. GORDON, in reply, said that it was not so much the actual scar that gave rise to the epilepsy, but the adjacent tissue, which had become epileptogenic. Electrocorticography might reveal the presence of excitable cortex for a varying distance adjacent to the area of scarring or atrophy, and not uncommonly there was surrounding microgyria, which was largely responsible for the abnormal discharges.

DR. H. LANDER asked whether it was possible for the electroencephalogram to distinguish between the arteriosclerotic type of Parkinson's disease as opposed to the usual degenerative type.

DR. GORDON replied that the electrocardiogram had no value in either diagnosing Parkinson's disease or allowing any conclusion to be reached as to the underlying process of the disease.

DR. R. L. THOROLD GRANT asked whether the electroencephalogram revealed any changes in migraine.

DR. GORDON said that as a rule the electroencephalogram was normal in migraine, or else might reveal only a non-specific abnormality. During an actual attack a disturbance of the α rhythm might occur, or slow rhythm might be seen arising in the affected parieto-occipital region.

DR. J. L. HAYWARD asked whether the electroencephalogram showed any particular characteristics in cases of imbecility.

DR. GORDON replied that whether the electroencephalogram showed any abnormality or not in mental deficiency depended upon the cause. If there was brain damage as a result of birth trauma and various forms of cerebral disease, the electroencephalogram might reveal abnormalities as a result of those processes. However, when the mental deficiency was primary the electroencephalogram was usually normal.

DR. CHINNER asked whether the electroencephalogram had been employed in relation to criminal offences, and whether the electroencephalogram revealed evidence of abnormality in criminals.

DR. GORDON, in reply, said that studies had been carried out on persons found guilty of major criminal offences. Some of the findings suggested that sudden unmotivated crimes were associated with an immaturity of the cortical rhythms, particularly in psychopathic personalities characterized by aggression with episodes of destructive and purposeless behaviour. However, it was rare for serious criminal offences to occur as a direct result of an epileptic seizure, either during a period of epileptic automatism or during the confusion that might follow a major seizure.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

APPOINTMENT OF DISTRICT SURGEONS.

[From *The Sydney Herald*, April 30, 1832.]¹

To the Editors of *The Sydney Herald*.
Gentlemen,

HAVING heard nothing lately about the proposed scheme of appointing District Surgeons throughout the country, I venture to submit the following statement to the consideration of His Excellency the Governor, with a hope that he will see the importance of adopting some measure to provide medical aid to those remote districts, which are, at present, incapable of offering sufficient remuneration to a medical man by private practice alone. From the district of Illawarra to the Southern Boundary of the Colony, a distance of at least 150 miles along the coast, and from the coast to 40 miles inland there is not one medical man: in that space there are above 1000 persons, of whom the assigned servants may be estimated at 800, the remainder is with a very few exceptions made up of poor settlers and their families. This, I admit, Gentlemen, is (punning apart) an extreme case, but the evil is severely felt in other districts. Humanity to the miserable wretches, who, without any choice of their own, without any prospect of extraordinary advantage to be derived from this distant separation of themselves from the means of obtaining the necessities of life, requires some provision being made for them by the Government in the case of sickness. The appointing of a District Surgeon would also tend to discourage, if not to put an end to the practice now beginning to be common amongst the idle and worthless of that class, to feign sickness, in order to be sent to some distant Hospital, which they know

¹ From the original in the Mitchell Library, Sydney.

will be a punishment to the master as well as the means of mixing with their associates and shipmates, and of forming plans for robberies and other crimes. A tax of 10s. per annum per head on every assigned person, and of £1 on every free person employed, would enable the Government to give a salary of £300 per annum to as many surgeons as the several districts might require. The master might be authorized to retain the £1 out of the wages of his free men.

It would be of great advantage in the district alluded to, if the surgeon were appointed a Police magistrate with a further salary of £100 per annum, as the duties of his situation might be more troublesome, and should therefore require a larger salary. I feel convinced that if His Excellency were to desire it, to be notified to the settlers of the district alluded to, that he would make such an appointment, and if he were to fix upon some central situation for the establishment and were to call upon each to say what he would contribute for the building of a Gaol and Hospital and residence for the Superintendent, that he would find a great readiness in all to assist in such an undertaking. Some would supply labour, others rations: some would supply materials, and others money. The cost to the Government would not exceed £1500 for the building and £100 or £200 per annum for salary.

VERBUM SAT SAPIENTI.

Correspondence.

POST-GRADUATE DIPLOMAS FOR THE GENERAL PRACTITIONER.

SIR: A large proportion of surgery in Australia is performed by general practitioners, and therefore some effort should be made by all concerned to raise the standard of this work. This could be achieved by means of organized post-graduate courses of lectures, followed by the conferring of a diploma in surgery, by examination.

At present the only surgical post-graduate qualifications available are M.S. and F.R.A.C.S. In each case two-stage examinations of a very high standard are required. This is suitable for those who wish to specialize, but most general practitioners are not prepared, for various reasons, to attempt long and difficult preparations for these examinations. It is suggested that a one-stage (or possibly two-stage) examination of reasonable standard could be introduced by some post-graduate body—for example, the universities (and this could be especially applicable to the new medical school of Western Australia before its degrees and planning are finalized)—and/or by the College of General Practitioners, and/or by the established Royal Colleges. Negotiations could be entered into with the universities and the Royal Colleges by the Australian College of General Practitioners when this body is established.

It is likely that many surgically minded general practitioners would attempt such an examination in their efforts to improve their own standard, and this would have a cumulative effect of raising the general level of surgery throughout the country.

The above suggestion could be extended and applied to other branches of medicine—for example, paediatrics, medicine, obstetrics, anaesthetics *et cetera*—and in view of the vast ramifications of medical practice, some men may be more interested in medical administration. The profession could be well served by them, if they turned their attention to the study of medical ethics, medical administration and medico-political subjects. We may require men with this special knowledge to guide the profession safely through the ever-growing mazes and tortuous pathways of modern medicine.

The final result would be that the general standard of medical practice would be raised, and the status of the general practitioner greatly enhanced. Of course, he would still remain the family doctor and the mentor of his patients.

When the College of General Practitioners is organized throughout Australia, it would be well within its reach to establish post-graduate teaching hospitals (first in central cities like Melbourne and Sydney, and later in all the capital cities), where short intensive post-graduate residencies could be carried out in preparation for examinations; and also the honoraries for such hospitals could be drawn from our own ranks. In addition some appointments for clinical assistants may be made available—by negotiation—to

people holding such diplomas in the present teaching hospitals.

The country requires more hospitals, and surely some could be acquired and used for this purpose by a powerful body which a fully organized College of General Practitioners must become.

There are several important reasons why such a scheme should be evolved and carried out. Firstly, modern medicine is so all-embracing that it is impossible for any man to become proficient in all its branches. Secondly, in group practice, which is the general trend today, each man is able to study and develop his own particular bent, and because he is doing more of his own branch of the work, he has the facilities to raise his standard in that subject. Thirdly, he will have the satisfaction of, and confidence in, the knowledge that he can perform one branch of his work at a high level.

Finally, it may help to lift him out of a rut, where he is in great danger of being held, remaining a glorified clerk, bound down with carbon paper, with most of his time spent in writing in duplicate and triplicate, and with very little left in which to thoroughly examine his patients.

If the foregoing ideas were agreed to in principle by the general practitioners in Australia, it remains for their representatives, from general practitioner groups, societies, and College of General Practitioners, to form a council to implement the scheme.

The College of General Practitioners would be the logical body to carry out this function. Hence the complete organization of the College throughout Australia is essential. Such a function, of granting post-graduate diplomas, would greatly enhance the value and the standing of the College.

An organization representing, as it would, about 4000 general practitioners could attain these objects, and there would hardly be any limit to its achievements if it exhibited those qualities of vision, ambition, and confidence. There is only one real method whereby the status of the general practitioner can be raised to his true position, and that is by raising the standard of his work.

To sum up: A scheme has been propounded to raise the status of the general practitioner and also to enhance the standing of the College of General Practitioners. Some important reasons have been advanced, and post-graduate diplomas in the important branches of medicine, as well as in medical administration, have been suggested. It is essential that hospitals be established for residencies and honorary appointments. The scheme can be evolved and developed *pari passu* with the establishment of the Australian College of General Practitioners.

Yours, etc.,
179 Saint George's Terrace, H. E. H. FERGUSON.
Perth,
May 14, 1955.

PROLAPSED CORD TREATED BY CONTINUOUS MANUAL ELEVATION OF THE HEAD AND CÆSAREAN SECTION.

SIR: The case reported by J. B. Gray in your columns on May 14, 1955, recalls another. I write of it because it presented rather unusual difficulties, and the answer was simple and relatively aseptic. It may not always work, but it did on this occasion.

Mrs. S.G., aged thirty, had a son, aged eight, an only child, and very much desired the second, which was due to arrive on October 9, 1953. The membranes ruptured on the morning of October 18, and labour began that afternoon. At 6 p.m. the mother complained that "things felt wrong", and the fetal heart was irregular. On vaginal examination a loop of prolapsed cord was felt. The cervix was two fingers dilated and the fetal head high. A few minutes later the cord was in the bed. Pulsations ceased during each pain, but returned between the pains, which were strong but of short duration.

The main problem was geographical. Our obstetric hospital has no fully equipped theatre and is situated half a mile from the general hospital. Ambulance transport is therefore an essential preliminary to emergency Cesarean section. Even in favourable weather and in the absence of bystanders, elevation of the fetal head by sustained vaginal or rectal pressure during transport presents difficulties. But in this case an anatomical consideration was decisive: the mother weighed over 18 stone, and it was

impossible even to reach the foetal head from below without obliterating the foetal pulse.

The foot of the bed was therefore raised and chloroform anaesthesia induced to a sufficient depth to inhibit uterine contractions. Cord pulsation continued thereafter regularly and strongly, and ceased only if the mother's ample thighs were brought together. She was then transferred by ambulance, through heavy rain, past the usual crowd of "visiting hours", under light chloroform and in the "frog position". Once in the theatre, chloroform was replaced by ether. A living eight-pound infant was delivered by lower segment Caesarean section at about 8 p.m.

Chloroform was preferred, (i) to ether, as there was less risk of vomiting during induction and consequently less risk of pressure on the cord, and (ii) to "Pentothal", as it diminishes uterine tone more effectively. Its dangers are fully appreciated.

Yours, etc.,
P. W. GILL.

Singleton,
New South Wales,
May 21, 1955.

LUNG CANCER AND SMOKING.

SIR: If there has been an increase of incidence of lung cancer recently and if exhaust fumes of cars are under suspicion, one would think that this might apply even more so to the various insect sprays, in the use of which there has been such a marked increase in recent years, and some of which are so potent that we are advised to prevent them getting on our skin as much as possible.

Yours, etc.,
ERIC POCKLEY.

Avalon Beach,
New South Wales,
May 18, 1955.

THE USE OF PAS IN RHEUMATOID ARTHRITIS.

SIR: In reply to Dr. Naomi Wing (M. J. AUSTRALIA, April 16, 1955) in which she queried the diagnosis of the 60 cases of rheumatoid arthritis treated by me with PAS, the criteria upon which the diagnoses were made conform with the criteria laid down by the American Rheumatism Association. The first ten cases, which were the basis of my letter, were presented with their case histories and full details at the 1954 British Medical Association clinical meeting at Saint Vincent's Hospital, Sydney. Five of the patients were present. An eminent rheumatologist associated with Dr. Wing was present, and discussed the series with me. There was no query re diagnosis.

As suggested in her letter, I will be very pleased to submit for publication a further follow-up at the end of the third year. The communication under discussion was at the end of the second year. All the patients are alive and ambulant; the majority of them are enjoying a complete remission (Grade I response, American Rheumatism Association).

In reply to Dr. John Shanasy's statement (M. J. AUSTRALIA, May 7, 1955) that "it is high time that Dr. Brian Haynes and others ceased to make extravagant claims for the therapeutic efficiency of any single drug in the treatment of a disease with so many variants as rheumatoid arthritis", I suggest that he read my letter again. I did not "admit" to prescribing gold, sulphadiazine and rest as well as PAS, but I took care to emphasize the fact that PAS was only one ingredient in a plan of treatment. This is surely expressed in my concluding paragraph: "However, in practice I have found the combination of PAS, gold, sulphur and rest effective in treatment of rheumatoid arthritis."

This comment on my claims for PAS is particularly irksome to me, as I have taught for well over a decade that no drug or combination of drugs is the cure of rheumatoid arthritis: that clinical judgement and the adequate provision of physiological and psychological rest are the essentials of successful treatment. I maintained this point of view when the great majority of physicians, both here and abroad, were putting the extravagant claims of the cortisone hysteria into practice. I am very happy to be able to state that no patient treated by me at Saint Vincent's Hospital or privately was given cortisone, except for a very limited period for a definite objective, such as to straighten a deformity. The small percentage who, through the influence of relatives, medical friends or the Press, sought the "wonder drug" elsewhere, are now disillusioned or dead.

Apart from the comment on my claims, I found Dr. Shanasy's letter a very lucid statement of sound therapy for rheumatoid arthritis, corresponding in its broad principles and most of the details with my views of the subject. The details are less important than the overall general plan, providing the principle of "*primum non nocere*" is observed. This principle usually rules out cortisone, often "Butazolidin", sometimes gold and occasionally even aspirin. The non-toxic nature of PAS in the recommended dosage appears to me to be one of its advantages.

In conclusion, for the sake of clarity, I will summarize my conclusions:

1. As a result of clinical experience in some 60 cases of rheumatoid arthritis and from the laboratory findings of Trethewie, I think that PAS has a definite anti-rheumatic action.

2. Used in an adequate plan of treatment, which includes sulphadiazine and the occasional use of other drugs *secundum artem*, I have found it very useful in the treatment of rheumatoid arthritis.

Yours, etc.,
BRIAN HAYNES.

"Craignish",
185 Macquarie Street,
Sydney.
May 12, 1955.

MEDICAL REHABILITATION.

SIR: It was very heartening to see the articles in your issue of May 14 and the discussion by Dr. R. Money at the meeting at which these addresses were delivered.

Rehabilitation is an extremely important and at times neglected part of medical treatment. I would urge that rehabilitation commences immediately the patient reaches hospital.

We in the Paraplegic Unit of the Royal Perth Hospital are trying to commence retraining of patients whilst they are in the precincts of the unit. We feel that medical management and retraining must proceed concurrently.

The Commonwealth Rehabilitation Department is helping to take our patients after they leave hospital, but by that time it is essential that some progress should have been made towards replacing them, either in their previous position, or in retraining towards a new occupation.

The management of paraplegics in this State has improved since the inauguration of a unit at the Royal Perth Hospital. Already the unit has been able to return to activity two paraplegics who otherwise would have been an encumbrance on the community for many years to come. Their adequate management can only be undertaken in such specialized units as this, and it is hoped that such units will soon be seen all over Australia.

Yours, etc.,
Paraplegic Unit,
Royal Perth Hospital,
Perth.
May 24, 1955.

SIR: I was interested to read in the May 14 issue of your journal the account of the British Medical Association meeting on rehabilitation in Sydney during December last. The papers of Dr. Naomi Wing and Dr. Wade particularly interested me. What they had to say was not new to me, or to my several colleagues in the Commonwealth Rehabilitation Service.

For the past seven years we have been trying to demonstrate techniques of rehabilitation to the medical profession in particular, and to the community as a whole. We have, I believe, been largely responsible for demonstrating to industry and commerce the "good business" of employing the physically handicapped.

The rehabilitation centres of the Commonwealth Rehabilitation Service are today providing a programme of physical and social rehabilitation such as Dr. Wing, Dr. Money and others describe. Our programme of treatment is very similar to that of overseas centres. I had an opportunity recently to work with Howard Rusk at Bellevue Hospital in New York and with Frank Cooksey at King's College Hospital in London for a total period of twelve months, as well

as to visit other centres and clinics, including the Kessler Institute, the Kabat-Kaiser Institutes and the Stoke-Mandeville Centre.

At our rehabilitation centres here we are using all the techniques described by Dr. Wing, and it is a matter of some wonder to me that this is not known apparently to Dr. Wing. I am also amazed that so few members of the profession endeavour to acquaint themselves with the work of the Commonwealth Rehabilitation Service. This service was originally set up in 1948 for recipients of social service benefits such as invalid pensions and sickness benefits. The vast majority of the people we have helped, and are still helping, under these categories are young people from sixteen to thirty years of age—most of them recently and severely disabled. In the seven years of the service's operation we have successfully rehabilitated into worthwhile employment over 7067 severely handicapped men and women, all of whom may still have been receiving a pension today had we not provided this service.

From the purely economic point of view, we estimate there is a saving of over £400,000 per year on invalid pensions, and in addition the saving made through hastening the recovery of long-term sickness benefit cases is estimated, conservatively, at £40,000 per year. Also, the contribution to the national income from the productive efforts of former pensioners has been estimated at approximately £1,250,000 *per annum*. These figures should be compared with the annual cost of less than £430,000 to the National Welfare Fund for this rehabilitation service.

By recent legislation the facilities of the Commonwealth Rehabilitation Service have been extended to young people in the age group of fourteen to fifteen years who, but for treatment and training, would be likely to become invalid pensioners on attaining the age of sixteen years. Moreover, insurance cases are now eligible, the cost of their treatment being borne by the insurance companies. The service will also be available on a payment basis to individuals not otherwise eligible.

There are many more facts about the Commonwealth Rehabilitation Service—too many to relate in this letter; but I would be happy to inform any practitioner should he care to write to me.

Certainly there is a great deal of work to be done in this country in the rehabilitation of the disabled. I have been working in this field of medical practice since 1942, both here and overseas, and I would say that Australia is at least ten years behind developments in the United Kingdom and the United States of America. It is good to see Dr. Wing, Dr. Wade and others interesting themselves in the problem now; and there is much that hospitals and medical centres here can do to organize rehabilitation departments and so help to prevent "chronic invalidity".

Those of us who have worked, and are working, in the field of rehabilitation welcome the interest and participation of professional colleagues. It is primarily on their interest, understanding and cooperation that a future for the disabled depends.

Yours, etc.,

G. G. BURNISTON,

Principal Medical Officer.

Commonwealth Department of Social Services,
83 William Street,
Melbourne.
May 25, 1955.

MEDICAL REGISTRATION.

SIR: I strongly support Dr. F. W. Simpson in his plea for the easier registration of foreign-born doctors (M. J. AUSTRALIA, April 16, 1955). These men and women have had a raw deal from the medical profession in Australia. Under the guise of protecting our professional standards we have been accessories to the forcing of these doctors to work as labourers, although some of them may have spent a lifetime in medical work of the highest standing.

These people have a natural right to work at the profession of their choice, provided certain minimum standards of professional skill are maintained. Surely, then, they could be given simpler and quicker ways of demonstrating their professional skill than the method now enforced of doing the last two or three years of our medical course.

I urge all fair-minded members of the British Medical Association to press their Branch Councils for the adoption

of a more humane policy towards our European colleagues seeking medical registration in Australia.

Yours, etc.,

K. RAWLS.

Matthew Street,
Rosewood,
Queensland.
May 10, 1955.

BRITISH MEDICAL ASSOCIATION FLOOD RELIEF FUND.

SIR: Re your appeal for flood funds. Many of us have already given two or three times to this very deserving cause. I suggest it would be a heartening gesture if the New South Wales Medical Board would waive its rights to our registration fee of one guinea this year and donate the amount to our suffering colleagues. I am sure that the profession in New South Wales will vote unanimously for such a levy.

Yours, etc.,

H. E. HARGRAVES.

135 Fox Valley Road,
Wahroonga,
New South Wales.
May 16, 1955.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, changes et cetera have been promulgated in the *Commonwealth of Australia Gazette*, Number 14, of March 24, 1955.

AUSTRALIAN MILITARY FORCES.

Australian Regular Army.

Medical.

3/40000 Major-General F. K. Norris, C.B., C.B.E., D.S.O., E.D., relinquishes the appointment of Director-General of Medical Services, Army Headquarters, 25th June, 1955, and is placed upon the Retired List, with permission to retain his rank and wear the prescribed uniform, 26th June, 1955.

3/37652 Colonel W. D. Refshauge, O.B.E., relinquishes the appointment of Deputy Director-General of Medical Services, Army Headquarters, 25th June, 1955, is appointed Director-General of Medical Services, Army Headquarters, and to be Major-General, 26th June, 1955.—(Ex. Min. No. 52—Approved 17th March, 1955.)

Regular Army Special Reserve.

Royal Australian Army Medical Corps (Medical).

NX700349 Major J. R. Nimmo, O.B.E., is placed upon the Retired List (Eastern Command) with permission to retain his rank and wear the prescribed uniform, 31st December, 1954.

Citizen Military Forces.

Northern Command.

Royal Australian Army Medical Corps (Medical).—1/33098 Captain (provisionally) E. F. Reye is seconded for post-graduate studies in the United Kingdom, 26th January, 1955.

Eastern Command.

Royal Australian Army Medical Corps (Medical).—The resignation of 2/61553 Captain K. J. W. Stump of his commission is accepted, 18th December, 1954. 2/79109 Captain R. L. Manning is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Northern Command), 9th February, 1955.

Southern Command.

Royal Australian Army Medical Corps (Medical).—3/101017 Captain B. H. Gandevis relinquishes the temporary rank of Major and is seconded for post-graduate studies in the United Kingdom, 1st November, 1954. 2/123264 Captain B. Cleerehan ceases to be seconded for post-graduate studies in the United Kingdom, 10th January, 1955. The provisional rank of 2/101016 Captain R. D. Wilson is confirmed.

Central Command.

Royal Australian Army Medical Corps (Medical).—4/82088 Captain T. H. Beare is seconded for post-graduate studies in

the United Kingdom, 5th February, 1955. 4/32064 Captain R. S. Colton is appointed from the Reserve of Officers, 25th January, 1955. 4/35205 Major J. M. McPhie is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Central Command), 21st December, 1954. To be Temporary Major, 18th February, 1955: 4/32064 Captain R. S. Colton.

Western Command.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of 5/26521 Captain M. C. Smith is terminated, 21st October, 1954. To be Captain (provisionally), 22nd October, 1954: 5/26521 Malcolm Chennell Smith.

Tasmania Command.

Royal Australian Army Medical Corps (Medical).—6/15812 Major N. D. G. Abbott is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Central Command), 15th December, 1954.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps (Medical).

Eastern Command.—To be Honorary Captains: Donald Peter Ewing and Brian Hamilton Marshall, 17th January, 1955, and Joseph Alexis Carlin Brassil and Griffith Silas Spragg, 24th February, 1955.

The Royal Australasian College of Physicians.

VICTORIAN STATE COMMITTEE.

Week-End Meeting at the Alfred Hospital.

A week-end scientific meeting arranged by the Victorian Committee of The Royal Australasian College of Physicians will be held at the Alfred Hospital on Saturday, June 25,

and Sunday, June 26, 1955. All members of the British Medical Association are invited to attend. The subject will be cardio-vascular diseases. The programme is as follows:

Saturday: 11.30 a.m., Dr. A. Wynn, "Pulmonary Hypertension"; 12 noon, Dr. J. M. Gardiner, "The Role of Vectorcardiography, Ballistocardiography and Cardiac Catheterization"; 1.30 p.m., Dr. K. J. Grice, "Aortic Stenosis"; 2 p.m., Dr. M. Etheridge, "Constrictive Pericarditis"; 2.30 p.m., Dr. C. J. Officer Brown, "Advances in Cardiac Surgery"; 3.30 p.m., Dr. Clive Fitts, "Aspects of the Diagnosis and Treatment of Coronary Disease"; 4 p.m., Dr. A. J. Barnett, "Investigation of Peripheral Vascular Disease".

Sunday: 10.30 a.m., Dr. Kate Campbell, "The Diagnosis and Management of Heart Disease in the Newborn"; 11 a.m., Dr. Kate Mackay, "Cardiac Problems during Pregnancy"; 11.30 a.m., Dr. M. V. Clarke, "The Heart in Thyroid Disease".

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

The following notes relate to the Australasian Medical Congress (British Medical Association), Ninth Session, which is to be held at the University of Sydney from August 20 to 27, 1955.

Luncheon during Congress Week.

During Congress Week, members of Congress may obtain a buffet luncheon at the University Union. Morning and afternoon teas will also be available.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MAY 21, 1955.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory. ²	Australian Capital Territory.	Australia. ³
Acute Rheumatism	5(3)	..	3(3)	1	..	..	..	..	9
Anomiasis	..	..	8	..	..	..	..	..	0
Ancylostomiasis	..	..	..	..	..	..	..	..	..
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	1(1)	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile)	7(5)	12(12)	9(2)	..	2(1)	..	..	..	30
Diphtheria	6(1)	1(1)	1(1)	..	52(26)	..	..	..	60
Dysentery (Bacillary)	..	1(1)	3(2)	27(1)	4(3)	1	..	..	36
Encephalitis	..	1(1)	..	2(2)	..	..	..	..	3
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	45(12)	47(80)	..	2(2)	10(1)	..	..	..	104
Lead Poisoning	..	..	1	..	..	..	..	..	1
Leprosy	..	..	..	..	..	..	..	..	7
Leprosyphthisis	..	..	7	..	..	..	..	..	2
Malaria	..	..	..	..	..	..	..	..	4
Meningoencephalitis	2(1)	1(1)	1(1)	..	..	..	..	..	..
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	1(1)	..	..	..	..	..	..	..	1
Plague	..	..	..	..	..	..	..	..	..
Pollomyelitis	4(2)	6(4)	7(1)	3(3)	1(1)	..	..	..	21
Puerperal Fever	1	..	..	..	..	..	..	..	1
Rubella	..	6(4)	2	..	2(2)	..	..	..	9
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	9(4)	17(12)	4(1)	22(8)	2	1(1)	..	..	56
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	..	..	..	..	..	..	..	..	72
Typhoid Fever	..	..	..	..	..	..	..	..	2
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	3
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

¹ Figures in parentheses are those for the metropolitan area.

² Figures not available.

³ Figures incomplete owing to absence of returns from Northern Territory.

Invitations to Luncheon and Dinner.

Parke, Davis and Company, Limited.—Parke, Davis and Company, Limited, have extended an invitation to a number of members of Congress to luncheon at their new pharmaceutical manufacturing centre at Caringbah on Monday, August 22. The luncheon will be followed by an inspection of the production facilities at the centre. Transport will be provided. Any member of Congress desirous of accepting the invitation is requested to notify the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney.

Woollahra Municipal Council.—An invitation has been extended by the Mayor and the aldermen of the Woollahra Municipal Council to members of Congress who are aldermen or councillors of local governing bodies to dinner at 6.15 p.m. on Monday, August 22. The dinner will be held in the dining hall of the Council Chambers, 563 New South Head Road, Double Bay. Any member of Congress desirous of accepting the invitation is requested to notify the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney.

Royal Australian Air Force Dinner.—A Royal Australian Air Force medical officers' dinner will be held at the Royal Australian Air Force Mess, Richmond, on Tuesday, August 23. Dress will be blue uniform or "black tie". Any Royal Australian Air Force or ex Royal Australian Air Force member of Congress desirous of attending the dinner is requested to notify Dr. J. Witton Flynn, 183 Macquarie Street, Sydney. Details as to time and transport will be available at a later date.

Sports.

Racing.—A limited number of tickets will be available for overseas and interstate members of Congress for the race meetings at Warwick Farm Racecourse (Australian Jockey Club) on Saturday, August 20, and Saturday, August 27, 1955. Any member of Congress from a State other than New South Wales who wishes to avail himself of this facility is requested to apply to the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney.

Golf.—On Thursday, August 25, a stroke handicap competition will be played on the links of The Australian Golf Club, Kensington, for the T. G. Wilson Cup, presented by Sir George Wilson, M.D. The winner of the competition will have his name engraved on the cup. Any member of Congress who desires to take part in the competition is requested to communicate with the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney, giving the following particulars: lowest handicap (with name of club), the time at which he would like to play, and (if possible) the name of the member of Congress he wishes to partner. During Congress Week playing facilities will be available at the Australian Golf Club (Kensington), the Royal Sydney Golf Club (Rose Bay), the Manly Golf Club (Manly), the Killara Golf Club (Killara) and the Concord Golf Club, Limited. Any member of Congress wishing to avail himself of these facilities is requested to notify the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney.

Bowls.—The City Bowling Club has extended an invitation to members of Congress to luncheon at its club, Cook Park, College Street, Sydney, on Thursday, August 25. The luncheon will be followed by bowls in the afternoon.

An invitation has been extended to visiting members of Congress by the Bellevue Hill Bowling Club, Limited, to avail themselves of the club's facilities on Monday, August 22, Tuesday, August 23, Wednesday, August 24, and Friday, August 26.

Any member of Congress desirous of availing himself of these facilities is requested to apply to the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney.

Game Fishing.—The Sydney Game Fishing Club has extended an invitation to members of Congress to a day's fishing on Sunday, August 21, when it will provide boats, gear and luncheon for about 60 members of Congress. Following the day's sport, the club will hold a party at the anchorage. Any member of Congress desirous of accepting the invitation is requested to notify the Honorary General Secretary, Australasian Medical Congress (British Medical Association), 135 Macquarie Street, Sydney.

Medical Appointments.

Dr. L. C. Jessup has been appointed honorary medical officer to the Port Pirie Hospital, South Australia.

Dr. H. R. Bailey has been appointed Assistant Director of Psychiatric Services in the Division of Mental Hygiene, Department of Public Health, New South Wales.

Dr. J. M. Piercy has been appointed a member of the Dental Board of Victoria.

Professor A. B. P. Amies has been appointed a member of the Dental Board of Victoria.

Dr. C. S. Haughton has been appointed medical officer in the Mental Hygiene Branch, Department of Health, Victoria.

Dr. G. H. Ellis has been appointed an official visitor to the Charters Towers Mental Hospital, Queensland.

Dr. L. W. Linn has been appointed honorary consulting dermatologist of the Royal Adelaide Hospital.

Diary for the Month.

JUNE 13.—Victorian Branch, B.M.A.: Finance Subcommittee.

JUNE 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

JUNE 15.—Western Australian Branch, B.M.A.: General Meeting.

JUNE 15.—Victorian Branch, B.M.A.: Branch Meeting.

JUNE 16.—Victorian Branch, B.M.A.: Executive of Branch Council.

JUNE 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.I.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desirous to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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